Annual Statistical Number

Railway Age Gazette

SECOND HALF OF 1916—No. 26 SIXTY-FIRST YEAR

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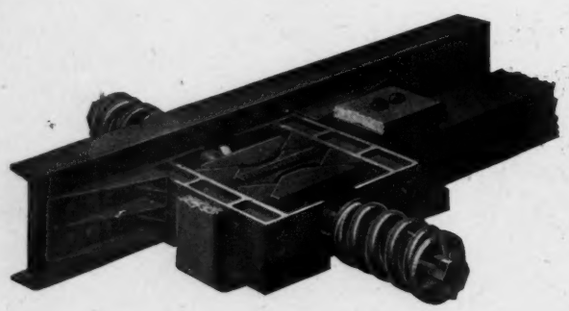

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Railway Age Gazette

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Among the most gratifying developments in the closing weeks of the year 1916 have been the distribution by many of the more prosperous railways of the country of substantial bonuses to certain large classes of their employees, and many voluntary increases in wages. In the aggregate this distribution and these increases of wages have amounted to several millions of dollars. The statements which have been issued in connection with them have set forth that they have been made because the companies have enjoyed a year of unusual prosperity, and because there has been an abnormal increase in the cost of living. In few cases has any part of the distribution been made to the employees in train service. The reasons are plain enough. In the first place, the managements believe that these classes of employees are being paid all that they are entitled to receive. In the second place, the year has been one of constant struggle between them and the companies, in which the men have made exorbitant demands, prepared to strike in spite of repeated offers of arbitration, and forced legislation through Congress which the managements regard as uncalled for, unjust and unduly burdensome. Even at the end of the year the differences with them remain unsettled, and the threat of a nation-wide strike has not been removed. The managements must, it would seem, be given universal commendation for having recognized in a substantial manner the efficient and loyal service of their other employees, and, as to those in train service, there must be few persons who, in the circumstances, will regard the discrimination against them as an unjust one.

Bonuses and Wage Increases to Employees

It has been the practice in the management of many railroads in United States to cut dividends in hard times and to restore them, or increase them, or pay an extra dividend in years of exceptional prosperity. The alternative to this would be to set up a specific "dividend fund" to which especially large appropriations could be made in prosperous years and on which the management could draw in hard times. The second method may be preferable, but the first is the one which has appealed to American financiers and investors. The speculative element in it is an attraction. It is to be expected, therefore, that so long as present methods prevail in a year of greatly increased gross and net earnings the dividend changes that will occur will be changes to a higher rate or extra dividends. If dividends are to be reduced in bad years, and at the same time railroad credit is to be maintained, and any future financing is to be done by the sale of stock, roads which are ably and conservatively managed, like the Louisville & Nashville, the Buffalo, Rochester & Pittsburgh, the Norfolk & Western, the Chicago, Milwaukee & St. Paul and the Union Pacific, must be expected to distribute to the owners some share of the increase in profits in an unusually prosperous year. As a matter of fact, however, only in the case of the Union Pacific and Norfolk & Western is there an extra distribution made representing extraordinarily large net earnings. The Louisville & Nashville, St. Paul, etc., have simply resumed this year rates of dividend which they had to cut in the hard times of 1914 and 1915. In almost every case of dividend changes on the larger roads the increases for this year have been sound and conservative. The only one that compares in the slightest degree with the extraordinary profits being reaped by industrial and manufacturing companies is the Pittsburgh & Lake Erie's extra dividend of 20 per cent.

The Increased Railroad Dividends

Material progress has been made on the federal valuation of the railways during the past year. On January 1, 1916, approximately 45,000 miles of lines had been covered by the roadway and track parties and smaller mileages by the structural, telegraph and land forces. At the present time approximately 95,000 miles of lines have been inventoried by the roadway and track parties. Director Prouty has stated that the present organization will be able to maintain this progress and that he expects that the field work on the 260,000 miles of line in the United States will be completed by January 1, 1920. During the summer the first preliminary reports were completed and late in the year so-called tentative valuations

Progress In the Valuation Work

were served on the Atlanta, Birmingham & Atlantic, the Texas Midland, the New Orleans, Texas & Mexico and the Kansas City Southern, while others are understood to be practically completed on the properties of the Elgin, Joliet & Eastern, the Los Angeles & Salt Lake, and one or two other lines. The appearance of these reports gave the railways their first opportunity to ascertain the attitude which the government would take on many of the important questions. When the work was first undertaken they organized in order to extend the fullest co-operation to the federal employees with the expectation that the aim of the government would be to ascertain the fair value of the property. With the appearance of these reports there has been marked disappointment on the part of the railway men, for they now feel that the department of valuation is endeavoring to establish the lowest possible valuations and to force the roads to fight before the Interstate Commerce Commission or in the courts to establish the real value of their properties. While important progress has been made in inventorying the properties, new problems have arisen with reference to the other and larger aspects of this work which threaten serious consequences and are a source of deep concern to the railways at the present time, while the worth of the entire work is also being jeopardized.

Receiverships and Foreclosure

Two important roads were taken out of the hands of receivers in 1916 and two important roads went into receivership. Singular as it may appear at first glance, neither the character of the reorganizations under which the St. Louis & San Francisco and the Western Pacific were taken out of the hands of receivers, nor the causes which led to the receiverships of the Boston & Maine and the Texas & Pacific reflect conditions of railroad earnings or of railroad credit in the calendar year 1916. More significant really is the comparatively large number of small roads sold under foreclosure. The number of these sales shows that the securityholders and creditors of these roads are willing to accept conditions as they find them without hope of material improvement in the near future. The plan under which the St. Louis & San Francisco was reorganized was dated November 1, 1915, and the fact that it was not actually put into effect and the road taken over by the new company until the latter part of 1916 was because of technical opposition on the part of the Missouri railroad commission. The plan, therefore, is the expression of opinion of the bankers and large holders of securities as to what future conditions would be based on their outlook from 1915 and not from the outlook of 1916. The St. Louis & San Francisco, by the successful application of sound principles of railroading, had already laid the basis for a sound reorganization of its finances before the wave of industrial activity and large railroad earnings came. The Western Pacific's reorganization plan was dated December 15, 1915, and representes a drastic sacrifice on the part of securityholders recognizing that it will take considerable time to build up substantial net earnings and that in the meantime fixed charges must be very low. The fixed charges are at the rate of $1,000 per mile for the new company. The receivership of the Boston & Maine was due to the inability to harmonize conflicting interests of securityholders of the parent company and leased line companies, and conflicting state regulation in regard to a general plan for a sound reorganization of the property without receivership. The Texas & Pacific receivership was also due to the failure of conflicting interests identified with the financing of the property to get together. It will be the success of the reorganization plans which have not as yet gone as far as foreclosure sales which will reflect more truly the state of railroad credit in 1916 than do the receiverships and foreclosures taking place in that year.

THE FREIGHT CAR SITUATION

THE conditions surrounding the car equipment market during the past year have been very complicated. Never before have the railways been confronted by such a situation. With the sudden demand for raw materials by the munition manufacturers, the price of steel has soared very high. The price of lumber has increased but little, and what increase has occurred has been due to the advance in the cost of labor and materials used in its manufacture and more recently to the shortage of cars. Labor throughout the country has become much more expensive. All of these conditions have a material bearing on the cost of car construction and on the fact that the prices now paid are 75 per cent more than those paid under normal conditions. As much as $1,800 has been paid for box cars, and over $2,200 for refrigerators. A conservative estimate of the average prices being paid for all freight cars has been given as $1,500. This has placed a serious burden on the railroads, especially on account of the fact that they have had to buy large amounts of new equipment.

From 1901 to 1915, inclusive, there was a total of 2,623,425 cars ordered—an average of 174,895 cars per year. During the first seven years of this period the average was 205,361 cars per year, while for the following eight years the average was but 148,238. This shows that at the beginning of 1916 the roads were considerably short of their equipment requirements. To be sure, the increase in the capacity of cars has been responsible for some of this decrease in the number bought, but the small earnings of the railroads during the latter period are responsible for most of it.

With the railroads thus behind in the matter of equipment, they have been forced to increase their orders for cars this year notwithstanding the high prices. About twice as many cars were ordered the last half of 1916 as were ordered during the first half, November being the heaviest month for the past three years. (Detailed statistics regarding the equipment orders placed in 1916 are given in an article published elsewhere in this issue.) Needless to say, the orders have been restricted to provide for only those cars which were absolutely necessary, but still the orders placed for the year approach very nearly the 15-year average above referred to.

Of the total of about 165,000 cars ordered for use in the United States and Canada, the greatest increases over last year are in the composite and steel underframe type, both of which show gains much larger proportionately than the increase in the total number of cars ordered, while there is almost no increase in the number of all-steel cars ordered. Considering the conditions of the raw material markets, both as to prices and deliveries, it is not surprising that the tendency has been to use as little steel in car construction as possible, and the returns can in no way be considered as indicating a tendency toward wood construction on its own merits.

The number of cars of all-wood construction ordered during the year shows an increase of over 40 per cent as compared with the number ordered during 1915, but the total number of cars ordered shows an increase of over 50 per cent compared with 1915. Indeed it is remarkable that the increase in this type of construction was not larger and it seems apparent that it has been resorted to more where the necessity for immediate deliveries was the paramount consideration, rather than from considerations of price.

In addition to the embarrassment of high prices, the roads have been handicapped by long delivery. Six to nine months is the best that can be expected, and on tank cars a year to a year and a quarter is not uncommon. The unprecedented demand for oils and gasolene both for export and for domestic use, has created a demand for this latter class of

equipment, and is responsible for the large number of tank cars ordered this year. With peace negotiations between the warring nations taking a somewhat favorable aspect there is hope for better prices and better delivery within the next year.

A REVIEW OF BRIDGE CONSTRUCTION

AMONG structural engineers, 1916 will be remembered first of all as the year of the second Quebec bridge disaster. This unfortunate event over-shadows all other incidents of the year with respect to bridge construction. But for this accident, the year would have recorded a crowning event in cantilever bridge building, just as 1915 marked the closing of the great Hell Gate arch. The years 1915 and 1916 also bear a definite similarity in having witnessed unusual inactivity in the inception of new railway bridge projects. The large number of important structures in process of building during both of these years were nearly all projects which had been commenced before January 1, 1915. There is this difference, however:—inactivity in bridge work during 1915 was the result of the extremely low earnings of the railroads and the uncertainty regarding their future while the dearth of new bridge work this last year was caused primarily by the high price of structural steel.

The quotation for structural shapes at Pittsburgh was 1.15 cents in March, 1915; 2.25 in March, 1916; 2.75 in November and now averages about 3.15. The rise in the cost of plates has been even greater owing to the demand for plates in ship and car building. The above figures imply deliveries at the option of the mills. The prices on stock materials which must be depended upon for any work required in a limited time are still higher.

In spite of these conditions a number of large bridge projects were started during the year which embody features of considerable interest. The Union Pacific is renewing the superstructure of its bridge over the Missouri river at Omaha. The four 246-ft. river spans of this bridge were rolled into place simultaneously a week ago while their predecessors were slid out of the way onto falsework, a feat which has attracted much attention. At New London, Conn., the New York, New Haven & Hartford is dealing with a difficult foundation situation by means of open caissons which are being sunk to a depth far beyond the limit of pneumatic work. Another important structure is the new 2327-ft. viaduct and bridge over the Allegheny river at Black Run, which is being built by the Bessemer & Lake Erie, and which involves the use of 10,000 tons of steel. Some work has been done on the reconstruction of the Pennsylvania Lines bridge over the Ohio river at Louisville, but definite plans for the entire structure have not been completed.

Late in the fall the Kansas City Terminal let a contract for a viaduct and double deck bridge over the Kaw river at Kansas City, involving the use of 25,000 tons of steel; an important item in the terminal improvements long under way at that place. Two projects on which action is anticipated soon are the reconstruction of the Poughkeepsie bridge over the Hudson and the provision of a new superstructure for the Queen & Crescent over the Ohio river at Cincinnati, Ohio.

The most important structure opened to traffic during the past year was the Memphis bridge over the Mississippi river. It is of interest that two other structures over this important stream were also completed during the past year, the new Keokuk, Ia., and St. Paul, Minn., bridges. A fourth, the St. Louis municipal bridge, by which that city expects to provide additional rail connections, is now being supplied with the long delayed east approach viaduct. Among movable spans the new three-track single-leaf bascule span of the North Western at Chicago presented a number of features of interest.

Although the number of new projects is limited, work has been in progress during the year on several notable structures. Within the last thirty days the record 720-ft. pin-connected simple span of the Metropolis bridge over the Ohio river was swung clear of its falsework. The 1500-ft. riveted span of the Sciotoville, Ohio, river bridge, continuous over three supports, is now in progress of erection, but will not be completed until some time next year. The Hell Gate bridge is receiving the finishing touches. The Burlington is making definite progress on its new bridge over the Missouri river at Kansas City which includes an innovation in the use of heat-treated steel in some of the members.

While concrete construction embodies an amount of work no less in the aggregate than steelwork and includes many reinforced concrete structures for track elevation and concrete arch bridges, notably on the Pennsylvania railroad, it has not included any great undertakings proportionate to the larger steel structures mentioned above, nor which permit of comparison with the Lackawanna viaducts completed a year ago.

WILL THE RAILWAYS OR THE GOVERNMENT REGULATE CAR INTERCHANGE?

THE circular issued by the American Railway Association Commission on Car Service, in accordance with its announced intention of making public the names of roads that have failed to co-operate in its efforts to relieve the car shortage, indicates one of the reasons why the Interstate Commerce Commission felt called upon to recommend to Congress that it be given full jurisdiction over car service rules and all matters pertaining to car interchange.

The railroads as a whole can hardly be blamed for the abnormal conditions which have brought about the present serious shortage of transportation facilities. An unprecedented volume of business, caused by temporary circumstances, has succeeded two years during which traffic was at a low ebb as well as a longer period during which the earnings of the roads have not been sufficient to prepare against any such overdraft on their facilities. But, having gotten into such a condition that their inability to furnish adequate transportation facilities is seriously affecting the commerce of the country it behooves all roads to exert every possible effort toward relieving the situation.

In such emergencies wide differences of opinion often arise as to the course that ought to be pursued and much valuable time is wasted in wrangling about it. This was the case a year ago when the railroads sought an increase in the demurrage rates as an important means of promoting car efficiency and the increase was not allowed until too late to do any good. This year the commission very promptly came to the assistance of the roads by allowing the increased demurrage rates to go into effect on short notice in spite of opposition on the part of many shippers. The railroads themselves also reached a prompt agreement that it was necessary for them to adopt heroic measure and, through the American Railway Association, they appointed a committee to decide what measures were necessary and promised to support it. A majority of roads have done so but a great many have not; and because they have not they have taken an unfair advantage of those that have in good faith attempted to comply with the requests of the committee for the common good.

The Conference Committee on Car Efficiency and its successor, the Commission on Car Service, have not adopted extreme measures. It has not, so far, even attempted to enforce the rules which the roads had agreed upon providing penalties for the misuse of equipment and failure to return cars to the owning road, although it intends to do so as to cars other than box, automobile and furniture cars after January 1. It has, however, attempted to bring about a redistribution

of the equipment on a basis more nearly in accordance with ownership. Its principal requests have been for certain necessary information, for the prompt return of open top cars to the railroads owning them, for a concerted effort to send box cars to those territories where the shortage is most acute, for the return of refrigerator cars to their owners and for restrictions to prevent sending to the seaboard freight which cannot be disposed of with reasonable promptness on arrival.

These requests, as the circular points out, were formulated in the interest of the public as a whole and with the knowledge that some roads would be compelled to make sacrifices to comply with them, but some roads have not even taken the trouble to furnish the commission with the reports requested, and others have not complied with its requests to attend conferences with the commission; and while many roads have, even at the expense of their own earnings and their local business, endeavored earnestly to do their part toward improving the general situation throughout the country, some of the roads, which are named in the circular, have continued to regard only their own interests. The circular says that lines have hesitated to return the kind of equipment of which they have an excess unless their deficiencies in other equipment are at the same time relieved. This naturally does not make for much progress.

The circular says: "The commission is strongly of the view that if any road does not fully and promptly support the program outlined with respect to both open top and box cars such road places itself unfairly in a position of advantage as compared with other railways in the same territory complying with the instructions of the Commission on Car Service." It not only does that but it helps to bring public criticism and discredit upon all roads, including those that attempt to act in a public-spirited manner as well as the delinquents.

It is possible that if the railroads fail to co-operate among themselves in doing the proper thing to improve the conditions of car distribution the Interstate Commerce Commission will find a way to prevent a recurrence at least of some features of the present situation. It has already taken a hand in the situation by issuing an order to the roads to show cause at a hearing on Thursday of this week why orders carrying out the requests of the Commission on Car Service should not be enforced. The car service rules as formulated and administered by the roads themselves have been practically ignored in periods of shortage. If they were required to be filed with the Interstate Commerce Commission and published as tariffs some roads would object, but the rules would probably be enforced.

THE YEAR 1916 IN RAILWAY CONSTRUCTION WORK

THE more serious an illness is, the slower is the recovery of the patient. The railways have been suffering several years from an acute business depression, a disease which has been aggravated by numerous operations more or less unskillfully performed by the various state and federal commissions. As a result, a number of the patients have succumbed, and the vitality of the others has been reduced greatly. After lingering in a serious condition for months, improvement first became noticeable early in the fall of 1915 when they received nourishment in the form of increased earnings. This improvement has continued throughout the past year with the result that, although they have not yet fully recovered their former state of health, they are showing signs of increased strength in a number of ways and while not yet beyond the danger of a relapse, the outlook is now hopeful.

As one indication of their increased strength, the mileage of new lines completed in 1916, although still far below normal, shows an increase of more than 165 miles over that built in 1915, when the total fell to the lowest point since the Civil war. This increase, encouraging as it is, does not measure the full improvement which has taken place. Just as the decrease in the mileage of lines built lags behind the arrival of a depression owing to the finishing of work previously authorized and under way, so the mileage statistics during periods of improvement fall short of the work actually begun. A considerable mileage of lines in addition to those not reported as completed in the statistics on another page, is now under construction, while a larger amount has been definitely located and plans are now being made for its building during 1917. For example, the Northern Pacific has let contracts recently for a considerable mileage of new lines in the Northwest, the Santa Fe has authorized the construction of several long branch lines in Texas and Oklahoma, while within the last two weeks the Burlington has received authority from the Missouri Public Service Commission for the construction of the first section of its proposed low grade line across Missouri. These are typical of a large number of projects now being authorized which indicate that the coming year will be one of marked construction activity. It is true that conditions in the material and labor markets will add considerably to the cost of work and in some instances may delay completion but these obstacles are being discounted in large measure by the present general prosperity of the roads and the necessity of providing increased facilities.

As might be expected, the largest mileage of new lines built in 1916 was in the Western and Southern states, for it is in these sections that there is the greatest need for additional railways. There are still considerable areas in these parts of the country without adequate mileage, and their development will be possible only as business conditions justify the roads in committing themselves to such work. The fact that no new mileage is reported as having been built last year in 14 states is not necessarily an indication that they now have adequate transportation facilities, but is in many cases a reflection of the uncertainty which has attended railway investments in recent years.

The cessation of railway construction work has been particularly marked during the past few years in those Middle Western states which have been most active in the passage of two-cent fare laws and other legislation tending to restrict railway earnings or to increase their costs of operation. It is significant that no new lines have been built in Iowa, Missouri, Nebraska and South Dakota this year, while in Oklahoma and Texas only 23 and 11 miles, respectively, have been built.

The mileage of second and other multiple main tracks completed is considerably less than that of last year. At first glance this seems to be inconsistent with existing conditions, for the railways are now handling the heaviest business in their history, and in many instances are suffering from a lack of facilities. It should be remembered, however, that the increase in business is so recent that the managements have not had time since it came to build additional main tracks. Among the projects which have been held up for some time, but which are now being carried to completion are the construction of the last gaps in the second tracks of the Erie and the Baltimore & Ohio, between Chicago and the Atlantic seaboard.

The situation in Canada is particularly interesting at this time. In contrast with conditions in 1914 when the mileage of lines built reached 1,978, and exceeded that in the United States for the first time in history, the mileage built in 1915 fell to 718 miles, and that for 1916 has decreased still further to 290, less than half of that for the previous year and only 15 per cent of that built in 1914. If current reports are correct, an actual decrease in the miles of lines operated or

at least of tracks in service may be shown next year because of the proposed removal of rails for shipment to the war front in France. The natural explanation of the present almost entire cessation of construction activities is, of course, the war. This is without doubt an important cause, but it is not the sole cause. For several years, culminating with 1914, there had been excessive construction in Canada, as a result of which the railway facilities in common with other improvements were overbuilt to such an extent that Canada now has a much greater mileage of railways in proportion to its population than any other country. This condition, together with the business depression, would have brought about a marked decrease in railway construction, which in fact had already begun when the war commenced.

While conditions in Canada are unfavorable to further extensive railway development at present, and will undoubtedly continue to be so for some time after the conclusion of the war, the contrary condition exists in the United States. With the heavy traffic and more favorable attitude on the part of the public and most of the regulatory bodies the managements of the railways are most optimistic regarding the future and are authorizing long-deferred extension and improvement work. From present indications 1917 should be a year of marked activity in this field.

ELECTRICAL PROGRESS IN 1916

THE development of new electrical designs and systems during the past year has been held up, to a great extent, because of the tremendous demand for standard machines and apparatus. The keen competition between the electrical manufacturing companies which has always been the greatest incentive for the development of new and improved machinery has been practically eliminated, the manufacturers being badly rushed with orders for their regular standard products. Another reason for this lack of new developments in the electrical field is the rapid approach to a condition of complete standardization of apparatus. This is the result of closer co-operation between users of electrical devices, the manufacturers, the American Institute of Electrical Engineers, the National Electric Light Association and the other influential electrical societies.

In general, however, progress in electrical design and installation has been satisfactory. This is especially true of steam railroad electrification. The progress of the electrification of the Chicago, Milwaukee & St. Paul mountain division has been remarkably rapid. The initial order for the equipment for this installation was placed with the General Electric Company in September, 1914, and by December, 1915, the overhead construction and the 100,000-volt transmission line, which parallels the railroad company's tracks, had been completed for a distance of more than 200 miles. It was not until this year, however, that actual electric operation was started. At this writing not only is the construction actually completed on 406 miles of the 440 miles eventually to be electrified but electrical operation on this much of the electric zone is actually a fact; also 37 of the 44 electric locomotives which are ordered have been delivered and are now in use. This means that the electrical construction work, including catenaries, transmission lines, rail bonding, building of substations, etc., on 206 miles of line have actually been completed during 1916 and that electric operation has taken the place of steam operation on this part of the line during this year. The locomotives are equipped with the first direct current regenerative braking system ever installed on any locomotive and the railroad officers who are in close touch with the operation of this equipment report that this feature is a distinct success.

The next largest main line steam railroad electrification in importance to the Chicago, Milwaukee & St. Paul is the Elkhorn electrification on the Norfolk & Western. The original electrified zone consisted of 30 miles of main line to which have been added during 1916 a three-mile section on the Pocohantas branch. In addition, 15 route miles or approximately 50 single track miles are now under construction west of Vivian, the present western end of the electrified division. Part of the new work will be on the main line and part on the branches. It has also been decided to electrify about five additional miles on the Bluestone branch. With these additions, the total track mileage of electrified lines will be over 150 miles. New locomotives have also been ordered to provide for the increased mileage and traffic.

Work on the new electrified tunnel and terminal of the Canadian Northern entering Montreal, which has been held up on account of the European war, was resumed and partial shipment made of the 2,400-volt electric locomotives. The Butte, Anaconda & Pacific and the terminal division of the New York Central have each ordered additional electric locomotives. Work is proceeding on the Chestnut Hill suburban electrification of the Pennsylvania at Philadelphia. This improvement involves 12 route miles, or 25 track miles, part of which is on the main line.

In electric car lighting the general tendency is toward the underframe or body-hung type of axle generator and during 1916 practically every manufacturer of car lighting generator equipment has developed and placed on the market a generator of this type. A notable development in car lighting practice is the use of the steam headlight turbine as a source of power for lighting cars on suburban trains. The Baltimore & Ohio and the Chicago & North Western are the pioneers in the use of this method of car lighting but indications are that they will not be alone in the use of this system as its simplicity, economy and general adaptability have attracted wide-spread attention. Another factor which affects the progress of the art of car lighting is the development of the gas-filled lamp in small sizes for use in electric lighted cars. These lamps not only give a better quality of light than the ordinary vacuum type, but are about 25 per cent more efficient.

Broadly speaking the general tendency in the manufacture of electrical machinery for central stations is toward the large, efficient turbo-generators. The progress of the steam turbo-generator units has been so great during the last few years, and certainly during 1916, that the manufacture of 30,000 kw. units is a common occurrence and units of 75,000 and 100,000 kw. capacity are now being considered. A single unit turbine of 45,000 kw. capacity has been ordered by a large central station company. These large capacity turbines are of the horizontal type, the vertical type being a thing of the past. The development in efficiency of the steam turbine has been so great that the gas engine and Diesel engine, though they exceed it in theoretical performance, have been eliminated as commercial possibilities in large central station practice. The thermal efficiency given for the largest turbine is about 25 per cent, which is a remarkable performance for a steam unit. The water rate for the largest turbine is less than 12 lb. as compared to about 17½ lb. for the most efficient reciprocating unit. The cost of the turbine per kilowatt is approximately one-fifth that of the largest reciprocating unit.

When considering the progress in electrical development during the year from the railroad man's standpoint, it is impossible to overlook the remarkable advances in the art of wireless telephony. The year 1916 will be marked as the time when the human voice was first transmitted across the entire continent without the aid of wires, a most remarkable performance and one which is a monument to the perseverance and ingenuity of American engineers.

PROGRESS IN SIGNALING

THE length of railroad in the United States equipped with automatic block signals has increased during the past year about 1,800 miles, a figure which, in view of the circumstances, is encouraging. On our more prosperous railroads the signaling departments are second to no department in their vigor and enterprise, and the past year gives continued evidence of this fact. By reason of high and increasing costs, everybody's plans for new work have suffered, and many estimates for extensive new mileage of automatic block signals, postponed already for one or two years, have had to be postponed again until 1917; but the signal engineers keep their goal steadily in view, and they not only hold their own, but make progress. The mileage of new automatic signals now under construction (2,200) is considerably greater than the total completed in 1916 and further plans for 1917 aggregate 1,500 miles of road additional. The profitableness of block signaling often has to be demonstrated to incredulous directors over and over, before the money is forthcoming; and so it has to be recorded again today, as in past years, that the progress made, gratifying as it is, is still too much confined to the larger and more prosperous companies. Immediate financial considerations, rather than the broad view warranted by scientific demonstration and reliable experience, continue to rule, in far too many cases. As in 1914 and 1915, single-track lines have been the field of the most important extensions.

And with this salient feature of the situation—that the signal engineers make progress in spite of weighty obstacles—there is, this year, a small cloud on the horizon: manual block signaling has actually been discontinued on a considerable mileage. Besides this, the installation of automatics to supersede the manual system continues to affect this item; and the total length of road in the United States worked under the manual system is only 258 miles more than a year ago. This cloud is not a large one, for the roads in question continue to operate their more important lines under the space interval system. On those lines of thinner traffic, where the space interval has been abandoned it was more in the nature of a refinement; and in times of stress, refinements have to be sacrificed. It is to be remembered also that now, as for years past, our total manual mileage is not the significant figure that it might seem, for two reasons: first, that on many long lines the space interval as a rule is used only for passenger trains, and, secondly, because these lines have little interlocking, and the block system is not so entirely depended on as in the case of busier lines.

In connection with automatic signaling, the railroads of America—and also the people of America, if they could become interested in such technical details and realize their importance as elements in safe and rapid transportation—can congratulate themselves on constant improvement in the efficiency of the marvelous and delicate mechanisms which constitute the essential features of the system. Perhaps the most important development of the past year has been the increased attention to track-circuit relays of low resistance and batteries of higher voltage. Further elaborate tests, costly in labor and time, will still be necessary in this department.

In interlocking machinery the progress in the use of electric and pneumatic power for operating switches and signals, prominent in past years, continues to be a main feature. Power apparatus is costly, and hand-operated machines continue to be more economical for a large majority of all the plants, except the largest and busiest; but that the virtues of power apparatus are fully appreciated is shown by the increasing use of electric motors for working the signals (by current from primary batteries) in plants where the hand power levers are still retained for the switches.

On many roads the visible progress in interlocking during the past year has been comparatively small; has not represented the improvement that has been accomplished. This is because much labor and money have been expended in replacing machine parts, castings and other facilities which, in the preceding lean years, have been allowed to continue in service in below-standard condition.

Two improvements of a radical nature which have been notable in recent years—light signals and "position light" signals—have continued to make progress during 1916. The satisfactory results with light signals on the St. Paul road in the Rocky Mountains undoubtedly will tend to warrant a wider use of this type of signal. The position-light signal thus far flourishes on only one road, the Pennsylvania; but that one seems to be going forward in a way to justify the favorable conclusions formed a year ago.

A third radical improvement, the automatic stop, has made considerable progress during the past year. If we speak of visible progress, it is in only one direction—the development of speed-control apparatus on the New York Municipal Railway, Brooklyn, N. Y. The Miller system on the Chicago & Eastern Illinois has been improved in detail; and a half dozen of the more serious experimenters, in different parts of the country, are still at work; but their results thus far are "not for publication." The New York, New Haven & Hartford is keeping up its investigations. The railroad companies, as a whole, seem to have made little or no progress, and the American Railway Association had nothing to say at its last meeting. The automatic stop is a refinement of refinements, and everybody seems satisfied, in the strenuous circumstances now hampering all railroad operations, to let this refinement wait. The Brooklyn experiments, however, are reported as very successful, and the valuable knowledge derived from this experience, will in time inure to the benefit of all the railroads.

THE YEAR IN MAINTENANCE WORK

THE year now closing has been one which will long be remembered by those in the maintenance of way department. The two preceding years had shown reduced earnings with the consequent necessity of holding expenditures for maintenance down. Late in the summer of 1915, business began to improve very rapidly although this became evident too late in the season to enable the maintenance of way department to profit to any extent. With the continuing of heavy business throughout the winter it became evident very early in the spring that more liberal appropriations would be available. A general spirit of optimism prevailed, ambitious programs of improvement work were prepared and those in charge resurrected estimates for work which they had long desired to do but which previously had been considered financially impractical. As spring arrived a great deal of work was authorized and actually undertaken but it was only a short time until complaints began to arise regarding a shortage of labor. The same activity prevailed in the manufacturing industries and they required larger than normal forces. Also there was an actual shortage of men in the country. The result was that all railway work was seriously delayed and a considerable amount closed down or postponed to enable the forces available to concentrate on the remainder and continue it to completion.

This condition forced many of the railways to previously untried sources of labor. The greatest decrease in track labor was among the Italians, Austrians and other nationalities involved in the European war, large numbers of whom had been called home to fight. Their absence was not noticed during 1915, but when the demand for men increased, they could not be recalled. As a result many northern and eastern roads brought large numbers of negroes from the south on to their lines at wages previously unheard of by them. This at once created a stringency in the south where some roads were forced to raise wages from the previous standards

of $1 to $1.25 per day to figures considerably above this and others suffered a shortage of labor for the first time in their history. Another distinct movement of railway labor was that of considerable numbers of Mexicans as far east as New York City, although few had previously gone east of Chicago. This created a shortage of men on the southwestern roads which was overcome in part by the bringing of others from Mexico.

Even with these large transfers there existed a serious shortage in almost all parts of the country and wages rose rapidly, some roads paying as high as 25 cents per hour for track labor when the highest rates the preceding year seldom exceeded 17½ cents. The unrest among the men also resulted in the usual difficulties with strikes, particularly in the east, the Boston & Maine having 2,500 track men out at one time.

These conditions have focused increased attention on the housing of the employees with the result that a number of roads have built improved camp and car equipment for them, and have given more attention to their comfort in an endeavor to hold them in the service. One merited increase in wages was that in the salaries of section foremen, a long delayed but deserved recognition of an unusually faithful group of employees. The unusual labor conditions have resulted in the very peculiar situation that many of the roads were unable to spend the money authorized for current maintenance of way and improvement work, and have large unexpended appropriations in their accounts at the close of the year.

This handicap upon maintenance work was accentuated by heavy increases in the costs of almost all materials, and the impossibility of securing early deliveries at any price. For the first time since the formation of the United States Steel Corporation in 1901, the prices of rails were changed, being increased $5 in the spring and the same amount again late in November, so that they now cost $38 and $40 for Bessemer and open hearth, respectively. Previous to the first raise, the manufacturers gave notice of it and urged the roads to order their 1917 requirements early. As a result most of them ordered at that time, a full year in advance of delivery. In the fall the second increase in price was made without previous notice and only a few roads had placed further orders before it went into effect. Almost immediately after its announcement, the roads realized that the tonnage of unfilled orders on the books of the steel manufacturers was the largest in history and that if they desired any rails early in 1918 they must order promptly. As a result over 750,000 tons, or about 25 per cent of a normal year's requirements, were ordered during the first two weeks of December alone for delivery 15 to 18 months in the future. Other materials have risen more or less directly in proportion. Tie plates and track fastenings have increased in price while deliveries are similarly delayed. Bridge materials have advanced in cost, not directly because of congestion in the fabricating shops but because of the rising costs of the plain materials.

Thus while greatly increased sums have been available for maintenance work, it has been impossible to spend all that which was authorized, and of that spent a considerable amount has gone for increased costs of labor and materials, so that the expenditures do not reflect the amount of actual work done as compared with earlier years. However, even with these severe handicaps, the roads have been able to make material progress in taking up deferred maintenance and the properties are in better condition than a year ago.

An action of much importance just before the close of the year was the order of the Interstate Commerce Commission changing the fiscal year to end on December 31 instead of June 30. By this act, one of the most serious obstacles to the economical conduct of maintenance of way work has been removed. The effects should be far reaching, especially in such unusual times as those through which we are now passing.

A YEAR'S PROGRESS IN LOCOMOTIVE BUILDING

ONE of the striking features of the locomotive orders for 1915 was the fact that orders for practically 50 per cent of the year's total were placed after October 1, and notwithstanding the constant and rapid increase in the price of materials, the outlook for a big year's business during 1916 has been fulfilled. Since January 1, 1916, orders have been placed for almost 2,900 locomotives, an increase of more than 1,300 over the number ordered last year. This increase is only natural in the face of the large increases in the amount of traffic which has been moved during the past year and a half, the report of the chief inspector of the Division of Locomotive Inspection of the Interstate Commerce Commission for the fiscal year ending June 30, 1916, stating that there was an increase of 6,000 locomotives in service over the previous fiscal year.

While the increase in the prices of locomotives has not been as marked as that in the case of cars, a conservative estimate will show that locomotives ordered during the past year have cost from $5,000 to $20,000 each more than similar locomotives ordered during the year 1914, the average increase during that period being at least 50 per cent. A statement recently made public by the Buffalo, Rochester & Pittsburgh shows that the Mikado type locomotives purchased during 1914 were obtained at a price of $20,300, while those ordered during 1916 cost $33,900 each. A similar comparison of Mallet type locomotives shows an increase from $32,300 each to $51,500 each. In both cases the locomotives ordered during the two years are comparable, being of the same design and total weight and were ordered from the same builder. That still further increases in prices during the coming year may be expected is evident from an inspection of the conditions of the material market. A comparison of the prices of some of the materials entering into locomotive construction as quoted last week, with the quotations for one and two years ago are as follows:—

	December 21.	1 year ago.	2 years ago.
¼-in. boiler and flange steel, per lb.	$ .0365 to $ .0515	$ .0235	$ .0115
Steel forging billets, per ton.....	80.00	53.00	24.00
2¼-in. boiler tubes, per foot of length	.132	.097	.09
Pig iron, per ton.....	23.00 to 35.95	17.40 to 19.95	9.50 to 15.17

As the present prices, or higher, will be effective for locomotives ordered during the early part of 1917, while those of a year ago were probably effective on a large number of the early orders during the present year, there can be no doubt as to the trend of locomotive prices, at least for several months to come.

The types showing the greatest gains in the number ordered, as compared with last year, were the 2-10-2, the 4-6-2 and the 4-8-2 types, the increase in the number of these locomotives ordered being proportionately much greater than the increase in the total number of locomotives ordered. Although there was an increase in the number of Mikado type locomotives, this was so small in comparison with the increase in the total number of locomotives ordered that it seems evident that this type is losing, while the Santa Fe type is gaining favor for use in heavy freight service. Considering the success with which locomotives of the latter type have met in service and the ability to provide a flexible driving wheel base which has been made possible by the lateral-motion driving box, the wider application of the Santa Fe type seems assured.

In 1911 the first locomotives of the Mountain type were placed in passenger service on the Chesapeake & Ohio to facilitate the handling of passenger trains on heavy mountain grades without double heading. With the exception of 1912, each succeeding year has seen orders placed for a

few of these locomotives, the total number ordered up to the beginning of 1916 being 47. That this type of locomotive is rapidly establishing itself is indicated by the fact that during the current year orders have been placed for about 180 of these locomotives for passenger and fast freight service. Few locomotives of the Pacific type have been built with total weights over 300,000 lb. and tractive efforts exceeding 40,000 lb. Such locomotives with average axle loads as high as 67,000 or 68,000 lb. and tractive efforts approaching 50,000 lb. may be considered as constituting the limit of weight and tractive effort which can be reached with the Pacific type.

The average weight of the Mountain type locomotives, now in service or on order, exceeds 330,000 lb. and the possibility of increasing the hauling capacity with these locomotives is well indicated by the fact that they have been built to exert tractive efforts as high as 57,000 lb. with average axle loads slightly under 60,000 lb.

That the Mallet locomotive is giving a good account of itself is indicated by an increase of practically 100 in the number ordered this year as compared with those ordered during 1915. Orders for a considerable percentage of this number were placed by roads which are successfully using the Mallet locomotive in road service. The Virginian Railway has placed orders for ten 10-coupled locomotives to have a total weight of 670,000 lb. and exert a tractive effort of 147,000 lb., and it is also noteworthy that this road has ordered a Triplex locomotive similar to those which have been built for the Erie, but of slightly less total weight.

Superheaters were included on about 80 per cent and brick arches on about 70 per cent of the locomotives ordered this year. The tendency towards an increase in the degree of superheat has been especially marked during the last six months, increases in the number of units having been specified in many of the locomotives ordered during that time, as compared with similar locomotives built during the past two years.

Last year attention was called to the fact that economy and capacity increasing devices were applied to two existing locomotives for each new one so equipped. This ratio has practically been maintained during 1916, and considering the large increase in the number of locomotives ordered this year, considerable acceleration in the improvement of existing power is evident.

The constant increase in the size of locomotive boilers which has taken place during the last few years has led to the serious consideration of the effect of the constantly increasing tube lengths which have thereby been necessitated. It has now been well established that there is an economical limit, beyond which there is little to be gained from additional tube heating surface obtained by increasing the tube lengths. The result of this growing conviction has been reflected in the increase in the number of locomotives, the boilers of which have been built to include combustion chambers, there having resulted therefrom not only a more efficient distribution of the boiler heating surface, but improved combustion due to the increased firebox volume.

Probably the most far reaching development of recent years, not only in improved efficiency of combustion and boiler performance, but more particularly when considered from a broad economic standpoint, is the use of pulverized coal in locomotive service. This has been developed to a point where satisfactory results have been obtained in service, in about three years and its economic possibilities are such that in view of the constantly increasing price and commercial demand for coal, the next few years may see it well established as a regular feature in locomotive service.

That the number of stokers in service during the past year has increased fully 75 per cent is the natural sequence of the large number of the Mikado, Santa Fe and Mallet types which have been ordered during the year, most of these locomotives requiring a rate of firing to develop their full capacity well beyond the possibilities of hand-firing.

The use of heat-treated carbon and alloy steels for reciprocating parts, crank pins, axles, etc., has now become well established. Many of the problems of running gear design presented by the high power which must be transmitted from a single pair of cylinders in large single-unit locomotives have been greatly simplified by the availability of such material and the past year has seen its use extended to several additional railroads.

The lateral motion driving box for providing radial action to driving axles, which was first applied to 2-10-2 type locomotives built last year for the New York, Ontario & Western and the Erie, has been applied to more than 60 locomotives ordered during the past year.

One of the striking features of the locomotive market during the past year is the large number of orders for foreign loccmotives which have been placed in this country. Until this year, with the exception of locomotives built for Russia, these engines have generally been built to the foreign designs and it is interesting to note that during the latter part of the present year orders have been received from France, Spain and Italy, which are being built to American designs.

A comparison of the number of locomotives of the various types ordered during 1915 and 1916 clearly indicates that there has been no decrease in the tendency toward constantly increasing power units. While the 2-10-2 type will undoubtedly retain its supremacy for several years in heavy road freight service, it is evident that the limit of its capacity will soon be reached and the difficulties in the way of increasing the size of simple cylinders beyond that required by the 10-coupled wheel base, indicates that but little more can be done in the development of single unit locomotives operated by a single pair of simple cylinders beyond the possibilities in the types now in existence. Although in general the Mallet locomotive has never been favorably considered as a road engine, it has been successfully used in road service for some time on a number of railroads and it offers possibilities for further development along that line.

THE PROPOSED STANDARD BOX CAR

THE question as to whether or not the railways of this country should have a standard box car has been more or less discussed for a long time. No definite action toward the introduction of such a car was taken until two or three years ago when several railway executives, chief among whom is E. P. Ripley, president of the Atchison, Topeka & Santa Fe, despairing of any decided action by the mechanical men, set the ball rolling and the American Railway Association, as a result, appointed a committee in May, 1914, to prepare designs for a standard car. Mr. Ripley is chairman of this committee and the actual design of the car is in the hands of a sub-committee of which George L. Wall is chairman.

The advisability of a standard box car may be considered from several angles. With the variety of car designs now in service, the money which is tied up in stock for repair parts runs into excessive amounts and it is this phase of the matter which was directly responsible for the action of the railroad executives referred to above. Unquestionably a standard car would result in a reduction in the repair parts necessary to be carried in stock, but there would be no very great immediate effect shown as the result of its adoption. In fact, it would be some years before the beneficial effects in this respect would be noticed. While some claim that the standardization of the complete car is unnecessary because of the small amount of repair work necessary on the car body, arguing that if the trucks, draft gear, door fixtures, etc., are standardized, the real purpose of a standard car will be realized, the fact remains that the standardization of the body construction will mean the elimination of the badly

designed and poorly constructed car which is cheap in first cost and expensive in upkeep.

A standard car would result in uniformity in strength and the elimination of the myriad ideas, many of them haphazard, which are in evidence today. It would so standardize the material from which the car is constructed as to permit of manufacturers buying in large quantities at reduced prices and, if they so desired, to manufacture and stock the cars in times of depression. Then there is the matter of separate dies for each order of cars; such expense would be avoided. The cheaply built car which is now such a trouble maker would be eliminated.

The committee which is working on the design for the standard car has practically completed designs for the 60,000-lb., the 80,000-lb. and the 100,000-lb. capacity cars. The 60,000-lb. capacity car is of the double-sheathed type; the 80,000-lb. capacity car may be built of the double-sheathed type, the steel frame, single-sheathed type or the all-steel type, and the 100,000-lb. capacity car is of the all-steel type. Sample cars of these three types will soon be built, the construction of some of them having been started. The committee has kept in mind throughout the desirability of producing a car which will give a maximum service with a minimum first cost. It has conscientiously endeavored to produce the best car with the least disturbance to business conditions and in many cases it has arranged for the use of patented devices on a royalty basis, this being necessitated by the impossibility of designing any satisfactory substitute. In practically every case, however, the requirements permit alternates so that the only changes which would be required in many of the patented articles would be to make them conform to the standard dimensions and clearances. Take, for example, the matter of roofs; a Z-bar side plate has been used in the designs throughout and while two types of roof are provided there is no reason why any of the present roofs could not be employed, provided only that they will fit between the Z-bar side plates. No attempt has been made to standardize the draft gear or coupler, this being left to the action of the Master Car Builders' Association. Practically the only limitation placed on the draft gear is because of the standard spacing of the center sills.

It will thus be seen that in its proposed plans the committee gives the choice of practically five different cars with the option of using alternates in some features of their design. This will detract, to some extent, from the chief reason for the standard car, increasing the amount of material to be carried in stock for repairs over that which would be required if a definite standard were adopted. Of course careful attention has been given the matter of interchangeability between the different types of cars, but the permitted use of alternates presents a problem. The present M. C. B. interchange rules require that in repairs to foreign cars "the work shall conform in detail to the original construction" (Rule 16) with a few exceptions. This would necessitate, therefore, each road carrying in stock a large number of the alternates with which to make such repairs or to follow the present practice of holding cars for shipment of parts from the owning roads. This, of course, is not desirable, nor is it believed necessary, except, possibly, in some few cases. The fact that the committee has approved these alternates indicates they will serve their purpose equally as well as the standard parts, and that the safe operation of the car is in no way jeopardized by their use. This being the case why not change this rule to permit the application of the A. R. A. Standard regardless of the original construction of the car?

It should be borne in mind by all those who object to a standard car because of its eliminating some particular device which they favor, that if the work of standardization is to be carried out so that the railways will get the greatest benefit from it in the future it has got to rise above the whims or ideas of any individual mechanical department or officer. Of course, there are some of the items which are not being dealt with by the committee which are either already standards of the Master Car Builders' Association or in all probability soon will be and following the logical lines they would be included in the standard car.

However it is arrived at, a standard car is not only desirable but essential to maximum economy. If such a car is not adopted by the railroads themselves they will, sooner or later, have standardization forced on them by the United States Government. The railroads would undoubtedly have to spend large sums in acquiring patents, etc., but such expenditures would be amply justified by future savings. There is no need of shutting off improvement or progress. Any changes that are necessary in the car after it is adopted should be taken care of by a competent board of engineers retained for that purpose by some such association as the American Railway Association and basing their changes and improvements on the actual results being obtained in service.

THE SWITCHMEN'S ARBITRATION AWARD

THE award of the board of arbitration in the wage controversy between the railways and those of their switchmen who are members of the Switchmen's Union must present some interesting questions to the members of the four train service brotherhoods who refused the repeated offers of the railways to submit their demands to arbitration. It will also present some problems to the railways, but at any rate the situation is much more satisfactory to both sides than that created by the Adamson law. Of course a decision of the board regarding the wages and hours of switching crews is by no means a criterion of what the same board might have decided as to trainmen in general, because on the whole the wages of men engaged in yard work are lower and their hours and conditions of employment are more arduous than those of other trainmen. It is, moreover, possible to work yards in eight hour shifts, while such a practice is impracticable in train service.

The award to the switchmen, while giving the men an increase in pay and establishing eight hours as the standard for a day's work and a day's pay, recognizes the impracticability of maintaining a rigid limitation of a day's work in railroad service, and, therefore, imposes no punitive rate for overtime. In practice, therefore, it will be up to the railway managements to decide whether to establish a real eight-hour day in yard service or to retain the present conditions and pay the higher wages. With a real eight-hour day the daily earnings of many of the men who now work long hours would be reduced in spite of their higher rates per hour, but this would, of course, require more men to perform the same service and the expenses of the railways will be greatly increased in any event. As it is feasible to operate yards on an eight-hour day basis, except in cases of emergency, and as it is the manifest intention of the award to place yard service on as near an eight-hour basis as possible, the railways should make a sincere effort to comply in good faith with this intent. To attempt to do less would tend to discredit seriously the principle of arbitration as a means of settling future controversies.

The award to the members of the Switchmen's Union raises an interesting question as to the effect it will have on the still greater number of yard employees who are members of the Brotherhood of Railroad Trainmen, and who voted to strike rather than to submit their similar demands to arbitration. It would hardly be feasible for the roads to pay different scales of wages to employees in the same terminal, yet if the B. R. T. yardmen should accept the basis granted to the Switchmen's Union it would undoubtedly raise some internal complications in the brotherhood.

Railway Situation at Close of Year 1916

Striking Resemblances to and Contrasts With Conditions Which Existed at the End of 1906. What of the Future?

THE calendar year 1916 affords a basis for both striking comparisons and striking contrasts with the year 1906, just ten years before. Throughout 1916, as throughout 1906, the traffic of the railways, and especially their freight traffic, has been the heaviest ever known. In consequence, in the year just closing, as in 1906, both total earnings and net earnings have broken all previous records. Now, as was also the case ten years ago, there is being experienced a "car shortage" of great magnitude, and a congestion of traffic of unprecedented severity. The exact size of the car shortage in the last months of 1906 is not known, as the first statistics on this subject are for 1907; but the statistics for the first month of 1907 clearly indicate what had been the situation in the immediate preceding months. On January 2, 1907, the net shortage of freight cars was over 85,000; on February 6 it had increased to almost 138,000; and it never entirely disappeared until the end of June. Never before up to the present time was there a net shortage which lasted even until the middle of December.

There was a small net shortage in March, 1916, and a net shortage began again in September which reached 115,000 in November, which was continued up to the present time, and which, from present indications, will last throughout the winter and into the spring. The situation from now on for some months will depend not only on the volume of traffic but also on the weather. If the traffic continues to be heavy and snow and extreme cold prevail, the situation may grow worse, as it did in the early part of 1907.

Some Contrasts With 1906

While in the respects mentioned the history of 1906 has been repeated in 1916, there are, as already intimated, some respects in which these two years present sharp contrasts to each other. The situation in 1906 was a result of normal and steady development which had been going on throughout the preceding decade. The situation in 1916, on the other hand, has been a result of a series of extremely irregular and to a large extent abnormal developments during the preceding ten years.

In every fiscal year from that ended on June 30, 1897, to that ended on June 30, 1907, there was an increase in the gross earnings per mile of the railways of the United States; and in every one of these except 1904 there was an increase in net earnings per mile. On the other hand, during the last ten years there have been frequent and wide fluctuations in both gross and net earnings. There were declines in gross earnings per mile in 1908, 1909, 1911, 1914 and 1915, and there were declines in net earnings per mile in 1908, 1911, 1912 and 1914. The present enormous traffic and earnings are the result of increases which for suddenness and magnitude are without a precedent in the history of the railways of this country, and probably without a precedent in the history of those of any country.

The Sudden Deluge of Traffic

There was hardly any sign of the impending change until October, 1915. Then traffic came with a rush, and every single month from that time to this has been for that particular month in the year a record breaker in point of gross earnings. Until during the present period average gross earnings for the railways as a whole in a single month of $1,150 were good, and there apparently was only one month, October, 1912, when average earnings per mile had exceeded $1,300.

Complete earnings figures for the calendar year 1916 are available for only the nine months from January to September, inclusive. The largest earnings in the year are usually made in October and November, and this, when the complete figures are available, probably will be shown to have been true of 1916, but average total earnings per mile per month for the nine months, January to September, inclusive, were this year $1,279; and in three of these months, May, June and July, more than $1,300 was earned while in August all previous records were broken, with total earnings averaging $1,418 and $1,409 per mile.

These figures regarding earnings ought alone to be sufficient to explain why there has been so large a shortage of cars and severe a congestion of traffic during the last five months. There are, however, numerous statistics regarding the comparative development of the railways in the years preceding the traffic congestion in 1906, and regarding their development in the years immediately preceding the sudden increase in business within the last fifteen months, which throw a great deal of additional light on the general situation.

The steady increases in traffic and earnings which began in 1897 culminated in 1906 and in the early part of 1907, and doubtless they were the cause of the large and rapid expansion of railway facilities which occurred during this period. The violent fluctuations of total earnings, and especially the downward tendency of net earnings in the decade prior to 1916 likewise caused the remarkable slowing down of railway development which the statistics show occurred during this decade.

In the five years ending with the calendar year 1906 there were almost 23,500 miles of new railway built in the United States, an average of almost 4,700 miles a year. On the other hand, during the five years ending with 1916 there were less than 10,000 miles built, or an average of less than 2,000 miles a year.

In the five years ending with 1906 the number of locomotives ordered by the railways of the United States was almost 22,400 or almost 4,500 per year. During the five years ending with 1916 the number ordered has been less than 14,000 or about 2,800 a year.

In the five years ending with 1906 the total number of freight cars ordered was almost 1,100,000, an average of over 218,000 a year. During the five years ending with 1916 the number ordered has been only about 740,000, or an average of about 148,000 a year. (The statistics regarding new mileage built and cars and locomotives ordered both in 1916 and in preceding years are given in detail in articles published elsewhere in this issue).

There are no statistics available regarding the miles of all track (as distinguished from the miles of line) which have been built year by year, but the statistics of the Interstate Commerce Commission show the increases which have occurred in mileage of all tracks operated in each fiscal year ended on June 30. Its statistics show that in the five years ended on June 30, 1906, the increase in the total mileage on all tracks in the United States was 51,731, an average of 10,346 miles a year, while in the four years ended on June 30, 1915, the increase was only 28,318 or an average of only 7,079 miles per year.

The foregoing statistics set forth in a striking and even startling manner, one of the most important facts to be considered in connection with the present situation of the railways. This is, that the car shortage and traffic congestion of 1906 came at the end of a decade of rapidly increas-

ing business and earnings during which there had been a great expansion of transportation facilities, while the car shortage and congestion of traffic in 1916 have followed immediately on the heels of a long period of depression in the railway business, during which the increase of facilities was relatively very small.

Causes of the Heavy Traffic

What is the cause of the present great volume of traffic? Most people attribute it largely to industrial and commercial conditions resulting from the war in Europe. If it is due entirely to conditions created by the war it will pass away with the war, and the only thing that can reasonably be asked of the railways is that with their present facilities they shall meantime handle the business as well as they can. But to reason thus is to disregard the most significant fact disclosed by the experience of the last fifteen months. This fact is the extent of the present *productive capacity* of the people and the industries of the United States. The war in Europe did not create this productive capacity. It existed already, and the war, so far as it has affected conditions, has merely caused it to be fully utilized. The end of the war will leave the productive capacity of our people and industry unimpaired and it will be but a comparatively short time until there will develop conditions which will cause it to be fully utilized again.

Productive Capacity Exceeds Railway Capacity

Not only have the developments of the last fifteen months disclosed the enormous productive capacity of the people and industry of this country, but they have also shown that when it is being fully utilized the facilities of the railways are not adequate to the demands which it causes to be made upon them. To sum up, then, the industry and commerce of the country grew rapidly throughout the ten years ending in 1907, and almost throughout that period the facilities of the railways were increased so rapidly that they proved adequate to the demands made upon them. At last, however, the traffic did catch up with the facilities, the result being the great car shortage of 1906-1907. The year 1916, unlike the year 1906, marks the beginning, not the approach of the end, of a period of industrial and commercial activity and growth. There will doubtless be a painful and violent readjustment after the war ends, but there will be another period of industrial expansion after the readjustment is passed.

Since our railway facilities have proved inadequate at the beginning of the present period of prosperity, will they not prove inadequate to the demands which will be made upon them as soon as the period of readjustment is over? And if they prove inadequate at the beginning of a period of prosperity, what kind of a situation will they cause to develop if industry steadily grows more active and traffic heavier, as it did for several years prior to 1906?

There seems to be only one rational answer to this question. No matter how favorable to a period of prolonged and great prosperity other conditions may be, progress in industry and commerce will be sharply arrested, and there will not be any long continuance of prosperity, if the facilities of transportation are not greatly increased. The net operating income of the railways during the year now closing has been unprecedented, probably averaging more than six per cent on the investment in road and equipment. In the past whenever it has averaged over five per cent there has resulted a largly increased investment in new facilities. In view of the large net earnings now being made the expenditures during 1916 for new mileage and trackage, for new equipment and other improvement have been relatively small. This has been largely due to the extremely high prices prevailing. But the new mileage built in 1916 is more than that built in 1915, the orders placed for freight cars have been the largest since 1912, and the orders for locomotives are the largest since 1913; and the prospects are for a substantial increase in new construction and in orders for equipment during the year 1917.

Increase in Facilities Follows Increase in Net Return

The need for an enlargement of railway facilities is so obvious that everybody must now see it. Furthermore, the only means by which it can be secured should be equally obvious. The increase of railway facilities follows an increase in the percentage of net return, as certainly as the day follows the night. As already shown, there was much activity in the five years 1902 to 1906 in the construction of new mileage and trackage, and in the purchase of new equipment, and in that period the average net operating income earned in the various fiscal years on the investment in the road and equipment of the railways follows: 1902, 5.04 per cent; 1903, 5.14 per cent; 1904, 4.79 per cent; 1905, 5.02 per cent; 1906, 5.39 per cent. In every year but one net return exceeded 5 per cent.

On the other hand, as has also been shown, there was a heavy decline in new construction and in orders for new equipment in the five years preceding 1916, and the following figures regarding the percentage of net operating income earned in the fiscal years of this period show why this was the cause: 1911, 4.77 per cent; 1912, 4.52 per cent; 1913, 4.87 per cent; 1914, 3.77 per cent; 1915, 3.96 per cent. In every one of these years net return was less than 5 per cent, and in two of these it was less than 4 per cent.

Some question has been raised repeatedly as to whether the condition of railway net earnings really has been the cause of the decline in new construction and in the acquisition of new equipment. For example, in the hearings before the Newlands committee at Washington some of the members of the committee have called attention to the fact that the stocks of many of the better managed and more prosperous railways have steadily sold above par, that their bonds also have commanded what seem to the questioners figures which indicate a good market for bonds, and it has been asked whether any cases can actually be cited where strong railway companies have sought and have failed to sell at good prices securities to raise money for improvements. Points of this kind having been raised, the *Railway Age Gazette* recently addressed a letter to the presidents of several of the leading railroads of the country, asking them to give specific examples of how the condition of earnings and of the money market during recent years has interfered with their raising money for extensions and improvements. There has not been time as yet for replies to all these inquiries to be received. Some have been received, however, and they contain significant information. One letter which has been received is from the president of an important and relatively strong, prosperous and conservatively managed railroad in the Northwest.. He says in part:

> "This company has been for some time and is now desirous of building about four hundred miles of extensions of its railroad in sections of the Northwest that are not at present adequately served by transportation facilities; but because of its inability to dispose of its securities, at a price that, as a business proposition, would warrant their sale, has been unable to make these much needed extensions.
>
> "Until within the past few years this company was able to dispose of its 4 per cent. bonds at approximately par and in common with other first class securities, these were considered by the purchasers to be a good investment; but in the last few years we have found it practically impossible to dispose of these bonds at a price that would meet the demands of an economical and proper administration of its financial affairs.
>
> "In 1915 in order to secure funds required for needed improvements and betterments, we were compelled to issue bonds drawing 5 per cent. and for improvements on our Chicago division we were unable to find purchasers for its bonds and were compelled to issue notes due in three years, bearing interest at 5 per cent. for that purpose."

Another letter which has been received is from the president of one of the greatest railway systems not only of the eastern part of the United States, but of the world, a system which has been managed with notable conservatism and

ability, and which has regularly paid substantial dividends. The president of this railroad says:

"Replying to your letter regarding cases where railroads had found it impracticable to do any new construction work because of their inability to get the public to invest in their securities, much depends upon how this question is put. Railroads cannot issue bonds and stock and throw them on the market to discover whether the public will take them or not. I know of no instance where any company with sound credit and good earnings had any difficulty in selling its securities to the public, provided the rate was satisfactory compared with others, but there have been very many cases where the railroads have discovered through consultation with investors and bankers that there was no market for railroad securities except on terms too onerous for the railroads to accept, and, further, because many railroads, including our own, suffered such a reduction in earnings that they were not warranted in offering securities to the public or proceeding with large items of construction work or large orders for equipment.

"For instance, in the case of (an important subsidiary property) I know that for a long period we had to defer selling bonds on more than one occasion, although the construction work was proceeding, because market conditions were not favorable. Its mortgage bonds would be guaranteed by (its owners) but in lieu of selling them, we temporarily authorized short term borrowing at lower interest rates. For the period 1908 to 1915, the general experience of most of the railroads was that they had not sufficient business or earnings to furnish a credit basis to make proper additions to their property and equipment, nor was there sufficient prospect of any increased traffic to justify proceeding with any great expenditure program. During this period, short term financing had to be resorted to because of the impossibility of selling capital stock on any basis, or mortgage bonds except on onerous conditions."

As also has been seen, the recent increase in gross and net earnings was followed immediately by an increase in expenditures for new construction, for improvements and for equipment. The statistics regarding new construction, orders for equipment, etc., in 1916, which are published in this issue of the *Railway Age Gazette*, show clearly that the revival in the expansion of facilities already has begun. Past experience indicates that the continuance and intensification of this revival is absolutely dependent on the continued earning by all the railways of the country of a net operating income exceeding 5 per cent on their total investment in road and equipment; and in view of present conditions in the money markets of the world it is probable that past experience is not an entirely safe guide, and that the minimum average net operating income necessary in the past to cause a rapid expansion of railway facilities will not be sufficient in future. The average net operating income earned on investment in road and equipment in good years and in bad probably cannot, in view of past experience and of present financial conditions, with safety be allowed to fall below six per cent.

The Heart of the Railway Problem

This takes us to the very heart of the railway problem as it now presents itself to the railway managers and railway regulating authorities of this country. How is net operating income to be maintained? The railways are not seeking increases in rates. They are, however, putting forth strenuous efforts in other directions, having the purpose of keeping their net operating income on a sound basis. They are handling the present enormous volume of traffic as economically as practicable with present facilities. They are making a determined resistance to the attempt of the employees in train service to secure unreasonable advances in wages. The Railway Executive's Advisory Committee has been presenting testimony before the Newlands committee in support of a plan intended to reform the present system and policy of regulation, and the adoption of which would, it is believed, enable substantial economies to be effected in railway development and operation, while at the same time preventing rates from constantly being hammered down by the federal regulating authorities and those of 49 states.

What are the prospects for the success of this general program as we approach the new year 1917? Already some of the respects in which the present conditions contrast with those prevailing exactly ten years ago have been outlined. There is still another important respect in which the present situation differs sharply from that which existed at the end of 1906. Public sentiment has changed. At that time the railways were the objects of intense hostility on the part of the public. They were being attacked upon the ground that they were flagrantly discriminating between persons, concerns and communities, and that their rates in general were excessive. They were being denounced for the extreme congestion of traffic that prevailed. Then, as now, a great movement by certain classes of their employees was under way for large increases in wages, and public sympathy was on the side of the employees. The result, within a few months, was the largest crop of state laws for the reduction of freight and passenger rates and for penalizing the railways for not promptly furnishing all the cars that were ordered by shippers, that ever was passed in this or any other country. Furthermore, the movement of the employees for higher wages was very successful and the fiscal year ended on June 30, 1907, was marked by an aggregate increase in the compensation of employees exceeding $170,000,000. A few months later came the panic of October, 1907, and within six months instead of being troubled by a shortage of freight cars, the railways had a net surplus of them exceeding 413,000.

Public Sentiment Hostile in 1906, Friendly in 1916

While ten years ago at this time public sentiment was so hostile to the railways, and shippers and the press were universally denouncing them, at the present time public sentiment is not unfriendly to them, and business men and the press generally recognize the reasons for the existing congestion of traffic and make allowances accordingly. Instead of the states being ready to pour forth a flood of laws injurious to the railways, state legislation is on the defensive all along the line, and there are no indications that there will be great activity in the passage of state railway legislation this winter. Instead of public sentiment being favorable to the train service employees in their movement for higher wages, it appears to be opposed to them, and there is a strong demand for legislation which will make serious railway strikes improbable, if not actually impossible.

With public sentiment so friendly to the railways in spite of the large earnings they are now making, and in spite of the most acute congestion of traffic ever known there seems to be more ground for optimism regarding the future of the railways than there has been at any time in over a decade. It may be that there will be further large increases in the wages of many classes of employees, both organized and unorganized. In fact, the managements of many railways have recognized the claims of the unorganized employees by giving bonuses to many thousands of them this year. In most cases it has been expressly stated that this has been done because railway earnings are extraordinarily large, and because there has been a serious increase in the cost of living within the last year. If, however, the large earnings continue, and the cost of living does not decline, it will doubtless be necessary in one way or another to continue to reward many employees more highly than has been done in the past. Increases in wages mean, of course, increases in operating expenses. Besides, there have been extremely great advances in the prices of all kinds of equipment and supplies, which further add to operating expenses. In fact, both operating expenses and taxes already have begun to show heavy increases. In the latest month for which statistics are available—viz., September—the percentage of increase in operating expenses and taxes per mile for the entire country was greater than that of the increase in total earnings per mile, the increase in total earnings being 12.6 per cent, and the increase in expenses and taxes 14 per cent. This tendency on the eastern lines, where the congestion of traffic is greatest, was especially marked, the increase in total earnings per mile being 12 per cent, while the increase in expenses and taxes was 18 per cent. Because of the severe weather almost throughout December, the increase in total earnings probably will prove to be relatively less and the increase in total expenses relatively greater than for the rest of the year. Finally, all the legislation needed to make our system and policy of regulation what they should be will not be readily secured. In view, however, of the progress which has been made within recent years in improving the management of the railways, in

improving regulation, and in educating business opinion and public opinion regarding the railway situation, and in view of the large earnings the railways are now making without any serious complaint from any source that they are excessive, the outlook for greater prosperity for the railways and affiliated industries and for a large expansion of railway facilities during the next few years, seems promising.

DIVIDEND CHANGES

Without exception the changes in dividend rates in 1916 as compared with 1915 were increases. There were increases in the regular annual rate, or resumption of a regular annual rate suspended in 1914 or 1915, and in some cases extra dividends. The largest of these extra dividends was that declared by the Pittsburgh & Lake Erie of 20 per cent, reflecting the great earning power of this property in a time of unprecedented industrial and manufacturing activity.

In almost all cases the increase in annual rates was a resumption of a rate which had had to be lowered in 1914 or 1915. Thus the Walters roads—the Atlantic Coast Line; Nashville, Chattanooga & St. Louis, and Louisville & Nashville—all of which had cut dividends to meet the severe depression in the South, which began in 1914, resumed their old 7 per cent rate. The Buffalo, Rochester & Pittsburgh and the Illinois Central went back to a 6 per cent rate and the Chicago, Milwaukee & St. Paul to a 5 per cent rate.

Name of road	Declared in 1916	Declared in 1915	Present annual rate	Annual rate in 1915
Alabama Great Southern, pref.	7½ [a]	6	6	6
Alabama Great Southern, com.	8 [a]	5	5	5
Atlantic Coast Line, com.	6	5	7	5
Buffalo & Susquehanna, com.	5	None [b]	5	None
Buffalo, Rochester & Pittsburgh, com.	5	4	6	4
Chesapeake & Ohio, stock	2	None	4	None
Chicago, Indianapolis & Louisville, com.	5⅛	None	None	—
Chicago, Milwaukee & St. Paul, com.	5	4½	5	4
Cincinnati, New Orleans & Texas Pacific, com.	12 [c]	11 [c]	6	6
Cincinnati Northern, stock	3	None	3	None
Cleveland, Cincinnati, Chicago & St. Louis, pref.	5	None	5	None
Cleveland, Cincinnati, Chicago & St. Louis, com.	5	None	5	None
Colorado & Southern, 1st pref.	2	None	4	None
Cripple Creek Central, com.	15 [d]	4	6	4
Illinois Central, stock	5¼	5	6	5
Louisville & Nashville, stock	7	5	7	5
Maine Central, pref.	5 [e]	—	—	—
Nashville, Chattanooga & St. Louis, stock	6½	5	7	5
New York, Chicago & St. Louis, 1st pref.	5	None	5	None
New York, Chicago & St. Louis, 2nd pref.	2½	None	None	—
New York, Ontario & Western, com.	3	None	4	None
Norfolk & Western, stock	7¾ [f]	6	7	6
Pennsylvania Company, stock	8	6	8	6
Philadelphia, Baltimore & Washington, stock	6	4	8	4
Pittsburgh & Lake Erie, stock	20 [g]	10	10	10
Pittsburgh, Cincinnati, Chicago & St. Louis, pref.	5	4	5	4
Pittsburgh, Cincinnati, Chicago & St. Louis, com.	5	2	5	2
Vandalia, stock	6	None	—	None
Union Pacific	10	8	8	8
Vicksburg, Shreveport & Pacific, pref.	5	None	5	None

[a] An extra dividend of 1 per cent on the preferred and 2 per cent on the common was declared in May, 1916.

[b] In 1915 the new company had just been organized. The initial quarterly dividend of 1 per cent was declared in July, 1916.

[c] In 1915 extra semi-annual dividends of 2½ per cent were declared. In the last half of 1916 an extra dividend of 3½ per cent was declared.

[d] An extra dividend of 10 per cent was declared in February and the regular rate was raised from 4 to 6 per cent in September.

[e] In the latter part of 1915 the stockholders voted to retire $10,000,000 of the approximately $25,000,000 outstanding common stock and to issue in place thereof $3,000,000 5 per cent cumulative preferred stock and $7,000,000 first and refunding 50-year 4½ per cent bonds. The common stock has been paying regular dividends at the annual rate of 6 per cent.

[f] In April an extra dividend of 1 per cent was declared and the annual rate raised from 6 to 7 per cent.

[g] An extra dividend of 20 per cent was declared in July and stockholders were given the right to subscribe at par to a new issue of stock to the extent of 20 per cent of their holdings.

EXTENSION OF RAILWAY OPTION IN NICARAGUA.—The Nicaraguan Congress has authorized the President to extend to the Pacific Railway Co. another six-months' option on the construction and management of a railroad to the Atlantic coast of Nicaragua.—*Commerce Report.*

MILEAGE OF AMERICAN RAILROADS BLOCK SIGNALED

The mileage of railroads in the United States operated under the block system, on January 1, 1917, as shown in the large table printed herewith, is 99,885 miles, an increase of 2,076 miles over the total reported one year ago (December 31, 1915, page 1253). In *automatic* mileage, which is the more significant figure, the total now is 32,978 miles, or 1,818 miles above last year. In manual signaling, the increases are largely offset by discontinuances, and corrections of errors and also by sections where the manual is superseded by the automatic. A number of roads,—for example, the Atchison, Topeka & Santa Fe and the Chicago, Burlington & Quincy—omit the mileage (formerly included) of lines of other companies on which they have only trackage rights; while one or two others have discontinued the use of the block system (manual) on a considerable mileage of lines of comparatively light traffic.

The detailed comparison of the totals of the *Railway Age Gazette* tables for the five years last past is as follows:

Miles of Road Worked by the Block System

	—Automatic— Jan. 1	Increase over prev. year	—Manual— Jan. 1	Increase over prev. year	—Total— Jan. 1	Increase over prev. year
1917	32,978	1,818	66,907	258	99,885	2,076
1916	31,160	1,471	66,649	8,206	97,809	9,677
1915	29,689	3,566	58,443	Decrease	88,132	943
1914	26,123	3,827	61,062	5,127	87,185	8,954
1913	22,296	1,961	55,935	Decrease	78,231	1,821

As has been explained in former statements, a number of roads exclude from their report of total mileage operated all those lines on which there is regularly in service only one locomotive and also lines on which only freight trains are run. Several prominent roads have long sections of line which are used exclusively for freight trains but which, being block signaled, are included in the total; while others have omitted the mileage of these lines from all columns.

The Panama Railroad is operated throughout by the block system, nearly all automatic.

Canada.—The block system is operated in Canada on 8,526 miles of road, of which 617 miles is automatic, as shown in the following table:

Lines in Canada Worked by the Block System.

	Miles of Road. Automatic	Manual	Total
Canadian Government (Intercolonial)	43	....	43
Canadian Government (Transcontinental)	..	6[1]	6
Canadian Pacific (Eastern)	222	4,535[2]	4,757
Canadian Pacific (Western)	36	18	54
Grand Trunk	5	3,350	3,355
Grand Trunk Pacific	4	....	4
Michigan Central	245	....	245
Toronto, Hamilton & Buffalo	62	....	62
	617	7,909	8,526

[1] Electric Train Staff.
[2] Includes 113 miles electric train staff.

WORK UNDER WAY AND CONTEMPLATED

In addition to the mileage of road block signaled, as reported above, railroads in the United States and Canada have under construction a considerable mileage of automatic signals, and there are a few notes of lines being equipped for operation by the manual system. A complete statement of this work, which will be published in the January issue of the "Railway Signal Engineer"*, will show 2,201 miles of automatic signals under construction, a figure which has probably been exceeded in very few instances in the past. In addition to this, the roads report 1,495 miles authorized or contemplated for the coming year; and this is likely to be increased by a considerable mileage on which estimates have been prepared and for which authorization will probably be secured early in the year. The same reports show non-

* Published in Chicago by the publisher of the *Railway Age Gazette.*

LENGTH OF RAILWAYS IN THE UNITED STATES WORKED BY THE BLOCK SYSTEM, JANUARY 1, 1917

Name of Road	Miles of Road: Automatic: Single track	Automatic: Two or more tracks	Automatic: Total	Non-Automatic: Single track	Non-Automatic: Two or more tracks	Non-Automatic: Total	Total both kinds	Total passenger lines operated	Percentage of total block signaled
Albany Southern †	...	...	...	27	16	43	43	43	100
Ann Arbor	...	...	...	1	...	1	1	294	...
Arizona & New Mexico †	1	...	1	...	...	...	1	110	...
Atchison, Topeka & Santa Fe (including Gulf, Col. & Santa Fe)	142	460	602	1,031	463	1,494	2,096	9,622	22
Atlanta & West Point	33	...	33	...	6	6	39	86	45
Atlantic Coast Line	11	316	327	75	6	81	408	3,844	11
Aurora, Elgin & Chicago	13	1	14	...	...	...	14	...	...
Baltimore & Ohio	40	445	485	1,929	703	2,632	3,117	3,117	100
Baltimore & Ohio Chicago Terminal	2	22	24	...	...	...	24	44	55
Baltimore & Ohio Southwestern	35	26	61	858	46	904	965	965	100
Cincinnati, Hamilton & Dayton	19	35	54	447	19	466	520	547	95
Staten Island	1	22	23	5	...	5	28	23	100
Baltimore, Chesapeake & Atlantic	...	...	...	87	...	87	87	87	100
Bangor & Aroostook	6	...	6	...	1	1	7	622	...
Bessemer & Lake Erie	...	...	...	64	131	195	195	191	100
Boston & Maine	550	625	1,175	...	...	...	1,175	2,213	53
Boston Elevated (Rapid Transit Lines)	...	18	18	...	...	...	18	18	100
Boston, Revere Beach & Lynn	...	14	14	...	...	...	14	14	100
Buffalo, Rochester & Pittsburgh	140	83	223	175	41	216	439	413	100
Butte, Anaconda & Pacific	8	...	8	...	...	...	8	48	...
Canadian Pacific	...	...	...	200	...	200	200	200	100
Carolina & North Western	...	...	...	2	...	2	2	133	...
Carolina, Clinchfield & Ohio	13	...	13	...	...	...	13	282	5
Central of Georgia	4	2	6	35	13	48	54	1,767	3
Central of New Jersey	41	201	242	...	...	...	242	460	52
Central Vermont	...	...	...	396	6	402	402	402	100
Cherrytree & Dixonville	...	...	...	31	...	31	31	31	100
Chesapeake & Ohio †	...	455	455	1,681	21	1,702	2,157	...	...
Chesapeake Beach	...	...	...	2	...	2	2	...	...
Chicago & Alton	411	187	598	99	37	136	734	1,025	72
Chicago & Eastern Illinois	68	154	222	171	33	204	426	872	49
Chicago & North Western	262	936	1,198	2,500	25	2,525	3,723	7,332	51
Chicago & Western Indiana	...	20	20	...	7	7	27	27	100
Chicago, Burlington & Quincy	236	214	450	7,795	735	8,530	8,980	9,243	97
Chicago Great Western	362	91	453	41	...	41	494	1,427	35
Chicago, Indianapolis & Louisville	339	...	339	...	...	...	339	578	59
Chicago Junction (freight line)	...	...	...	1	...	1	1	...	...
Chicago, Lake Shore & South Bend	56	...	56	...	...	...	56	...	...
Chicago, Milwaukee & St. Paul	366	952	1,318	3,183	35	3,218	4,536	8,487	53
Bellingham & Northern	...	...	...	55	...	55	55	55	100
Gallatin Valley	...	...	...	48	...	48	48	76	...
Idaho & Washington Northern †	...	...	...	111	...	111	111	111	100
Puget Sound & Wallapa Harbor	...	...	...	66	...	66	66	66	100
Tacoma & Eastern	...	...	...	76	...	76	76	87	...
White Sulphur Springs & Yellowstone Park	...	...	...	19	...	19	19	19	100
Chicago, Ottawa & Peoria	16	...	16	...	...	...	16	108	15
Chicago, Peoria & St. Louis	...	...	...	237	...	237	237	237	100
Chicago, Rock Island & Pacific	669	287	956	1,098	...	1,098	2,054	7,653	27
Chicago, Rock Island & Gulf	33	...	33	...	...	...	33	476	7
Chicago, St. Paul, Minneapolis & Omaha	23	173	196	629	...	629	825	1,673	49
Chicago, South Bend & Northern Indiana †	42	...	42	...	...	...	42	...	...
Southern Michigan	5	...	5	...	...	...	5	...	...
Chicago, Terre Haute & Southeastern	2	...	2	...	...	...	2	...	...
Cincinnati, Indianapolis & Western	99	...	99	282	...	282	381	381	100
Colorado Midland †	...	...	...	2	...	2	2	261	...
Columbia & Puget Sound †	10	9	19	...	...	...	19	51	37
Copper Range	...	...	...	79	...	79	79	77	100
Cornwall & Lebanon †	...	...	...	9	13	22	22	22	100
Cumberland & Pennsylvania	...	...	...	4	3	7	7	31	23
Cumberland Valley	7	56	63	105	...	105	168	164	100
Delaware & Hudson	187	247	434	...	35	35	469	802	58
Delaware, Lackawanna & Western	281	539	820	9	...	9	829	926	90
Denver & Salt Lake	...	...	...	22	...	22	22	254	9
Detroit, Monroe & Toledo Short Line	3	1	4	...	...	...	4	...	...
Duluth & Iron Range	...	17	17	...	...	...	17	204	...
Duluth & Northeastern	...	...	...	60	...	60	60	60	100
Durham & Southern	...	...	...	57	...	57	57	59	96
Eastern Kentucky	...	...	...	4	...	4	4	36	11
Elgin, Joliet & Eastern (freight line)	7	3	10	9	...	9	19	...	...
El Paso & Southwestern	213	...	213	...	...	...	213	1,023	21
Empire United (Electric)	40	6	46	...	...	...	46	...	...
Erie (including Subsidiary Lines)	64	916	980	568	168	736	1,716	2,168	79
Fort Dodge, Des Moines & Southern	16	...	16	...	...	...	16	...	...
Ft. Wayne & Northern Indiana †	51	...	51	...	...	...	51	...	...
Galveston, Houston & Henderson	1	...	1	...	...	...	1	...	...
Grand Trunk	2	99	101	867	215	1,082	1,183	1,183	100
Great Northern	189	343	532	288	...	288	820	7,305	11
Gulf, Florida & Alabama	...	...	...	143	...	143	143	154	93
Hocking Valley	...	2	2	281	...	281	283	283	100
Hudson & Manhattan	...	8	8	...	...	...	8	8	100
Huntingdon & Broad Top Mountain †	5	...	5	...	...	...	5	49	10
Illinois Central	370	631	1,001	9	...	9	1,010	4,526	23
Yazoo & Mississippi Valley	85	10	95	...	...	...	95	1,215	8
Illinois Traction	120	2	122	...	...	...	122	443	...
Indiana Railways & Light Co.	12	...	12	...	...	...	12	...	...
Interborough (New York City)	...	7	7	...	...	...	7	...	...
Interstate P. S. Co. (Indiana)	22	...	22	...	...	...	22	...	...
Kansas City, Clay County & St. Joseph	72	...	72	...	...	...	72	72	100
Kansas City Terminal	...	13	13	...	...	...	13	13	100
Kentucky & Indiana Terminal	...	...	...	3	8	11	11	11	100
Kentwood & Eastern	...	...	...	3	...	3	3	30	10
Lackawanna & Wyoming Valley	...	...	...	1	2	3	3	23	...
Lehigh & Hudson River	73	...	73	...	...	...	73	73	100
Lehigh & New England	3	...	3	...	...	...	3	77	...
Lehigh Valley	71	521	592	611	48	659	1,251	1,218	100
Ligonier Valley	...	...	...	14	...	14	14	14	100
Long Island	1	117	118	188	15	203	321	361	...
Los Angeles & Salt Lake	4	...	4	...	...	...	4	1,147	...
Louisville & Nashville	386	153	539	85	47	132	671	4,762	14
Louisville & Nor. Ry. & Light	4	...	4	...	1	1	5	21	...
Maine Central	437	63	500	...	...	...	500	1,103	45
Portland Terminal	5	12	17	...	...	...	17	20	...
Maryland, Delaware & Virginia	...	...	...	77	...	77	77	77	100
Mineral Point & Northern	...	...	...	26	...	26	26	26	100
Minneapolis & St. Louis †	...	...	...	11	...	11	11	1,537	...
Minneapolis, St. Paul & Sault Ste. Marie †	...	...	...	1,406	12	1,418	1,418	3,485	...
Mississippi River & Bonne Terre	...	...	...	2	...	2	2	46	...

†No report received; figures repeated from last year.

LENGTH OF RAILWAYS IN THE UNITED STATES WORKED BY THE BLOCK SYSTEM, JANUARY 1, 1917 (Continued)

Name of Road	Miles of Road: Automatic: Single track	Automatic: Two or more tracks	Automatic: Total	Non-Automatic: Single track	Non-Automatic: Two or more tracks	Non-Automatic: Total	Total both kinds	Total passenger lines operated	Percentage of total block signaled
Missouri, Kansas & Texas	10	19	29	10	...	10	39	1,609	2
Missouri, K. & T. of Texas	92	9	101	...	...	...	101	1,632	6
Missouri Pacific	60	39	99	3,527	20	3,547	3,646	3,890	94
St. Louis, Iron Mountain & Southern	159	13	172	2,639	170	2,809	2,981	3,477	85
Mobile & Ohio	5	...	5	38	...	38	43	949	5
Monongahela	...	2	2	...	...	...	2	97	...
Monongahela Connecting (Freight)	...	...	...	1	4	5	5	...	...
Munising, Marquette & Southeastern	...	...	...	4	...	4	4	4	100
Nashville, Chattanooga & St. Louis	...	...	...	111	...	111	111	1,230	9
Nashville Terminals	...	2	2	4	...	4	6	...	...
Nevada Northern †	1	...	1	...	...	...	1	155	...
Newburgh & South Shore	...	...	...	...	5	5	5	...	...
New York & Long Branch	...	38	38	...	...	...	38	38	100
New York Central Lines:									
Boston & Albany	3	209	212	...	1	1	213	378	56
Cincinnati Northern	...	...	...	205	...	205	205	205	100
Cleveland, Cincinnati, Chicago & St. Louis	24	98	122	733	285	1,018	1,140	2,203	52
Kanawha & Michigan	2	...	2	2	...	2	4	164	...
Lake Erie & Western and Northern Ohio	48	9	57	815	...	815	872	872	100
Lake Erie & Pittsburgh	...	...	...	28	...	28	28	28	100
Michigan Central	...	272	272	872	19	891	1,163	1,163	100
New York Central, Eastern Lines	2	766	768	1,678	543	2,221	2,989	3,013	96
New York Central, Western Lines	28	574	602	1,318	63	1,381	1,983	1,998	99
Peoria & Eastern (included in C. C. C. & St. L.)	...	...	...	...	...	...	...	...	...
Pittsburgh & Lake Erie	...	163	163	...	...	...	163	166	98
Toledo & Ohio Central	...	5	5	382	1	383	388	391	99
Zanesville & Western	...	...	...	68	...	68	68	68	100
New York, Chicago & St. Louis	146	12	158	...	...	...	158	513	31
New York Consolidated (Brooklyn)	...	18	18	...	...	...	18	70	...
New York, New Haven & Harford	2	347	349	1,097	374	1,471	1,820	1,921	95
Central New England	...	37	37	...	34	34	71	295	24
New York, Ontario & Western	49	150	199	...	...	...	199	493	40
New York, Philadelphia & Norfolk †	...	9	9	33	70	103	112	112	100
Cape Charles †	...	...	...	9	...	9	9	9	100
New York State Railways †	72	5	77	...	...	...	77	...	...
New York, Westchester & Boston	...	18	18	...	...	...	18	18	100
Norfolk & Western	208	536	744	905	...	905	1,649	1,879	88
Northern Pacific	683	500	1,183	259	80	339	1,522	5,669	27
Northwestern Pacific	10	16	26	...	...	...	26	472	...
Oakland, Antioch & Eastern	82	...	82	...	...	...	82	99	83
Ogden, Logan & Idaho	11	...	11	...	...	...	11	...	...
Ohio Electric	5	...	5	...	...	...	5	...	...
Ohio River & Western	...	...	...	111	...	111	111	111	100
Pacific Electric	...	11	11	18	...	18	29	612	...
Pennsylvania (including all east of Pittsburgh)	3	730	733	2,944	948	3,892	4,625	4,625	100
Grand Rapids & Indiana	...	...	...	225	2	227	227	546	41
Pennsylvania Co. †	...	529	529	790	226	1,016	1,545	1,647	94
Pennsylvania Terminal (Louisville) †	...	...	...	2	1	3	3	3	100
Pittsburgh, C., C. & St. Louis †	...	40	40	730	611	1,341	1,381	1,415	98
Vandalia †	6	...	6	303	61	364	370	782	48
Peoria & Pekin Union	...	...	...	...	6	6	6	16	...
Pere Marquette	136	11	147	...	...	...	147	1,629	9
Philadelphia & Reading	41	519	560	319	64	383	943	1,352	70
Philadelphia Rapid Transit †	...	7	7	...	...	...	7	...	...
Piedmont & Northern †	1	3	4	126	...	126	130	130	100
Pittsburgh, Shawmut & Northern	1	...	1	...	...	...	1	...	...
Portland Railway, Light & Power	21	...	21	...	...	...	21	75	...
Puget Sound Electric	20	8	28	...	...	...	28	46	...
Quincy, Omaha & Kansas City, and Iowa & St. Louis	...	...	...	295	...	295	295	295	100
Queen & Crescent Route:									
Alabama & Vicksburg	79	...	79	...	...	...	79	139	54
Alabama Great Southern	242	47	289	7	...	7	296	296	100
Cincinnati, New Orleans & Texas Pacific	197	129	326	9	...	9	335	335	100
New Orleans & Northeastern	109	15	124	...	...	...	124	196	...
Richmond, Fredericksburg & Potomac	...	19	19	10	59	69	88	88	100
St. Louis & San Francisco	709	34	743	10	...	10	753	4,769	...
St. Louis Merchants' Bridge Terminal †	...	6	6	...	1	1	7	10	70
St. Louis Southwestern (less than 1 mile)	...	...	...	...	...	...	...	...	...
Southern Illinois & Missouri Bridge †	...	5	5	...	...	...	5	5	100
San Francisco-Oakland Terminal	2	4	6	...	...	...	6	...	...
Savannah Union Station	...	...	...	1	3	4	4	4	100
Seaboard Air Line †	...	...	...	303	10	313	313	2,828	11
Southern	6	541	547	1,653	62	1,715	2,262	6,869	...
Virginia & Southwestern †	...	...	...	2	...	2	2	204	...
Southern Pacific: †									
Galveston, H. & San Antonio	276	...	276	998	4	1,002	1,278	1,281	...
Houston & Shreveport	...	...	...	40	...	40	40	40	100
Houston & Texas Central	3	...	3	812	...	812	815	750	...
Houston, East & West Texas	3	...	3	188	...	188	191	191	100
Iberia & Vermilion	16	...	16	...	...	...	16	16	100
Lake Charles & Northern	...	...	...	45	...	45	45	45	100
Louisiana Western	103	...	103	93	...	93	196	...	...
Morgan's Louisiana & Texas	95	...	95	141	40	181	276	...	...
Texas & New Orleans	113	...	113	318	1	319	432	...	...
Southern Pacific—Pacific System	2,411	414	2,825	4,170	45	4,215	7,040	7,040	100
Spokane, Portland & Seattle	...	7	7	...	...	...	7	550	...
Oregon Electric	...	7	7	...	...	...	7	154	...
Spokane & I. E. (less than 1 mile)	...	...	...	...	...	...	...	...	...
United Railways	1	...	1	...	...	...	1	19	...
Terminal R. R. Association of St. Louis	...	6	6	...	1	1	7	13	...
Terre Haute, Ind. & Eastern Traction	61	...	61	3	...	3	64	395	...
Texas & Pacific	...	...	...	398	...	398	398	1,944	21
Tidewater Power Co	...	...	...	6	...	6	6	...	...
Toledo, Peoria & W. (less than 1 mile)	...	...	...	...	...	...	...	...	...
Toledo, St. Louis & Western	...	...	...	188	...	188	188	450	42
Trans-Mississippi Terminal	4	3	7	2	...	2	9	...	...
Ulster & Delaware	24	...	24	...	...	...	24	130	18
Union (Pa.)	...	1	1	2	...	2	3	7	...
Union Pacific	699	827	1,526	11	...	11	1,537	3,592	40
Oregon Short Line	520	105	625	...	...	...	625	2,197	28
Oregon-Washington R. R. & N. Co.	615	28	643	1	...	1	644	2,021	32
Union Traction Company of Indiana	50	...	50	...	...	...	50	402	...
Virginia & Kentucky (less than 1 mile) †	...	...	...	...	...	...	...	...	...
Virginian †	...	...	...	13	...	13	13	484	...
Wabash	99	115	214	1,497	218	1,715	1,929	1,979	97
Wabash-Pittsburgh Terminal	3	4	7	...	...	...	7	60	...
Washington, Baltimore & Annapolis	14	...	14	...	...	...	14	52	26

†No report received; figures repeated from last year.

LENGTH OF RAILWAYS IN THE UNITED STATES WORKED BY THE BLOCK SYSTEM, JANUARY 1, 1917 (Continued)

Name of Road	Miles of Road: Automatic: Single track	Automatic: Two or more tracks	Automatic: Total	Non-Automatic: Single track	Non-Automatic: Two or more tracks	Non-Automatic: Total	Total both kinds	Total passenger lines operated	Percentage of total block signaled
Washington Southern †	...	6	6	...	26	26	32	32	100
Washington Terminal †	...	2	2	...	...	...	2	2	100
Washington Water Power Co.	22	...	22	...	...	...	22	22	100
Western Maryland	206	2	208	...	16	16	224	649	35
Western Pacific	11	...	11	...	...	...	11	941	12
Total	15,413	17,565	32,978	59,922	6,985	66,907	99,885	...	...

†No report received; figures repeated from last year.

automatic signals under construction on 290 miles of road.

The work under construction includes 1,604 miles of single-track and 596 of double-track, and that contemplated is made up of 780 miles of single-track and 715 of multiple-track. The following roads report the largest amounts of work:

Under Construction.	*Miles.*	*Contemplated.*	*Miles.*
Baltimore & Ohio	105.7	Baltimore & Ohio	119.8
Central of Georgia	143.4	Chicago, Burlington & Quincy	236.0
Chicago & North Western	178.0	Erie	166.2
Chicago, Milwaukee & St. Paul	396.5	Los Angeles & Salt Lake	117.0
Illinois Central	326.7	Norfolk & Western	112.7
Los Angeles & Salt Lake	138.0	Northern Pacific	216.0
Louisville & Nashville	165.0	Union Pacific	98.8
Michigan Central	95.8		
Southern	170.2		

The non-automatic signals reported under way are 44 miles on the Santa Fe, 121.9 miles on the Erie, 118 miles on the Texas & Pacific, and 5.5 miles on the Grand Trunk; and the Aurora, Elgin & Chicago and the New York, New Haven & Hartford report non-automatic signals contemplated.

Interlocking Work

The railroads of the United States and Canada have installed during the past year 98 interlocking plants, which number includes important additions and replacements as well as new plants. These were divided among the various types as follows: Mechanical, 41; electrical, 22; electro-mechanical, 23; electro-pneumatic, 9, and special, 3. As is the case with automatic block signals, the reports indicate a greater volume of interlocking work under construction on January 1, 1917, than was completed and placed in service during the past year. There are 119 plants on which work has been started, and 139 others authorized or contemplated for 1917. The division of these two classes among the various types is as follows: Mechanical, 101; electrical, 45; electro-mechanical, 45; electro-pneumatic, 66; and special, 1.

The most important individual projects completed include the following: An 80-lever electric plant on the Sante Fe at Los Angeles, Cal., an 80-lever electric on the Chicago & Alton at Pontiac, Ill., a 180-lever electric at Utica, N. Y., and a 56-lever electro-mechanical at Poughkeepsie, N. Y., on the New York Central, a 112-lever electric plant in the subway system of the New York Municipal, a 49-lever electro-mechanical in the Oakland Terminal of the San Francisco-Oakland Terminal Railways, a 120-lever electric in the Denver Union terminal, a 103-lever and a 71-lever electro-pneumatic plant in the Union Terminal at Dallas.

The following roads have important interlocking work under construction: Atchison, Topeka & Santa Fe, a 104-lever electric plant at Corwith, Ill., and a 92-lever electric at Dallas, Tex.; Boston & Albany, a 56-lever electric plant at Pittsfield, Mass.; the Illinois Central, a 67-lever electric at Pullman, Ill.; the Interborough Rapid Transit (New York), 15 plants including a 55-lever and a 51-lever electro-pneumatic; Lehigh Valley, a 104-lever electric at Buffalo, N. Y.; Missouri, Kansas & Texas, 11 mechanical and 1 electro-mechanical plants; the New York Central, a 68-lever electro-mechanical at Carman, N. Y., and a 72-lever electro-mechanical at Hoffman, N. Y.; the New York, New Haven & Hartford, a 53-lever electric at Stamford, Conn.; the Pennsylvania Railroad, 15 mechanical, 17 electro-mechanical and 1 electro-pneumatic, the latter, with 83 levers, located in Philadelphia; the Southern, a 72-lever electric at Charlottesville, Va.; and the Denver Union terminal, a 128-lever electric.

The important work reported contemplated by the various roads includes the following: An electro-mechanical plant of 56 levers at New London, Ohio, and a 56-lever electric at Cleveland, Ohio, on the Cleveland, Cincinnati, Chicago & St. Louis; a mechanical plant of 52 levers on the Detroit United Lines in Detroit Mich.; 36 plants on the Interborough Rapid Transit, the largest of which is a 51-lever electro-pneumatic on the White Plains Road line (New York City); a 56-lever electric interlocking on the Nashville, Chattanooga & St. Louis at Wauhatchie, Tenn., and 5 electro-pneumatic plants in the Nashille terminal of this road; 15 electric plants, 2 electro-pneumatic, and 1 mechanical, with a total of 579 levers on the New York Municipal; a mechanical plant of 80 levers on the New York, New Haven & Hartford, at New Haven, Conn.; and a 68-lever electric plant at McKee's Rocks, Pa., and a 104-lever electric plant at Neville, Pa., on the Pittsburgh & Lake Erie.

ARBITRATORS INCREASE SWITCHMEN'S PAY

The Federal Board of Arbitration, considering the demands of the Switchmen's Union of North America on 13 prominent roads for an increase of pay and the establishment of the eight-hour day, which has been sitting in New York City for many weeks past, filed its decision in the Federal Court December 23.

The principal feature of the award is an increase of five cents an hour for conductors and five cents an hour for helpers, from December 23, and running to December 23, 1917. The board grants the request for the eight-hour day, but allows only the regular rate for overtime; and expresses the opinion that the shortening of the actual work day is not practicable at the present time, except in a few instances.

The demand of the men, like that of the other trainmen in their recent negotiations, was for an eight-hour day with the same pay that has been received hitherto for ten hours; so that what the switchmen get is about half the demand; they will receive nine hours' pay for eight hours' work. The demand was for 47 cents an hour for helpers and 50 cents for switchmen; which was the same as asking, for eight hours, the same sum that is now paid for ten hours. The demand for rate and a half for overtime was rejected.

The roads involved in this arbitration are the New York Central, the Michigan Central, the Lehigh Valley, the Bessemer & Lake Erie, the New York, Chicago & St. Louis, the Delaware, Lackawanna & Western, the Texas & Pacific, the Chicago, Rock Island & Pacific, the Chicago & Eastern Illinois, the Baltimore & Ohio Chicago Terminal, the Minneapolis, St. Paul & Sault Ste Marie, the Chicago Great Western and the Peoria Terminal.

The arbitrators on behalf of the railroads were E. F. Potter, Minneapolis, St. Paul & Sault Ste. Marie, and T. W. Evans, New York Central. Those on behalf of the switchmen were

J. B. Connors and W. A. Titus, officers of their union; and the other two, named by the government conciliators, were Judge Charles B. Howry of Washington and Dr. Jeremiah W. Jenks of New York City. Public hearings were held for about three weeks in November and December.

The board prescribed the following rules:

"Overtime shall be paid pro rata on the basis of actual minutes worked.

"The pay of regular switchmen shall begin at the time required to report for duty, and end when relieved.

"Switchmen shall commence work and be relieved at designated points.

"Switching crews shall be paid at day rates for time worked between 6 a. m. and 6 p. m., and at night rates for time worked between 6 p. m. and 6 a. m.

"The present meal hour regulations shall apply to all crews assigned to shifts exceeding eight hours."

This arbitration directly involved about 3,700 yard conductors and brakemen. The total number of switchmen in all railroad yards throughout the country is about 50,000, the remainder being mostly members of the Brotherhood of Railroad Trainmen. The present yearly wages of yard conductors in Switchmen's Union yards vary from $1,100 to $1,500 and average $1,276. The brakemen's or helpers' wages run from $800 to $1,400 and average $980.

The award was signed by all six arbitrators; but the representatives of the union dissented from the 5 cents increase per hour, holding out for the increase demanded, and from the overtime pro rata award, holding out for time and a half. The railroad representatives dissented from the eight-hour day. The switchman who now works ten hours for $3.50 will receive $4 for the same ten hours' work. If his day is cut to eight hours, he receives $3.20.

Added to the formal award, and made a part of it, was a statement by Judge Howry and Dr. Jenks, in which they expressed the opinion that a general eight-hour day is not workable on railroads, and they say that in practice their award of the eight-hour day will leave in many cases to the switchmen a choice of more pay or more leisure and that the operation of their award will give the best of opportunities for study as to whether the workers really want shorter hours or more money.

This statement of Dr. Jenks and Judge Howry summarizes the facts of the situation in succinct fashion. It says, in part:

"Much emphasis has been laid upon the fact that the hours of work of the switchmen are often long. Although the standard workday on the railroads has been ten hours, frequently the men have worked from eleven to twelve, and sometimes even some hours longer.

"One of the reasons urged for the shorter workday is that men need more time to visit with their families, to take recreation, and to secure the other advantages of leisure. This argument, of course, applies to switchmen. A second argument is that the long hours result in physical exhaustion, often to a degree seriously injurious to health. The evidence shows clearly that, owing to the nature of the work, there are frequent opportunities for intervals of rest, and that the long hours testified to are due very largely, almost invariably, indeed, to delays caused by the interference of other trains and to similar reasons beyond the control of the railway managers or of the switchmen. During these delays the switchmen must usually be idle, so that long hours do not always imply excessive physical labor.

"Although it has seemed wise to award an eight-hour day as the standard minimum day, the overwhelming weight of testimony shows that the conditions of the various kinds of railway work are so different that only trial can determine just how far eight-hour shifts can be worked without prohibitory cost to the roads and undue disturbance of the work of their patrons. It seems to be clearly established that, under existing conditions, and probably even under conditions of traffic less strenuous than the present, it will not be possible to make the actual working eight-hour day effective in the case of more than a small percentage of the switching crews, not more than 10 per cent during the first year. While, therefore, it is urged that the eight-hour day be established, its introduction must be gradual. The percentage, therefore, of the switching crews that will be directly affected during the period of this award must of necessity be small. Most crews will work ten hours or more.

"The increase in pay imposes a heavy burden upon the railroads, which, owing to the interstate commerce law, they are unable to transfer to the shippers and thence to the public. Owing to the peculiar legal situation of the railways the board has thought that, since it is the duty of the properly constituted government authorities to protect the railway interests in this regard so far as is necessary, it has attempted to do justice as between the parties without giving any detailed consideration to the added cost to the railroads.

"The increase in wages has been most earnestly urged by the switchmen, on account of the increased cost of living, the hazards of the employment and the hardships of the work. These points, of course, have been all recognized in the award. While the full amount asked for has not been granted, a 5-cent increase to the former wages of all the switchmen is, by far, the largest given in any general switchmen's award, where the increase has usually been 1, 2, and 3 cents per hour, instead of 5 cents. This large increase has been given because the arbitrators recognized the validity of the arguments presented. Nevertheless, it seems just to the neutral arbitrators to present one or two other conditions which ought not to be overlooked.

"First, the railroads themselves have been subjected to greatly increased costs on account of the high prices of steel, coal and other articles of their consumption; and the enormous demands upon them, caused by the European war, have been so great that their work could not be most efficiently performed.

"Again, the conditions of the railroads are entirely different, in numerous respects, from those of other industries in which increases have been given to other workers. Many of such industries are munitions plants, steel works, and others whose profits have been stimulated by the war. Many of these, when the war closes, must go out of existence and their men will be thrown out of employment. Moreover, in many instances, those who continue business will be able to reduce the wages of their employees, judging from past experience.

"The railroads, on the contrary, will continue their force, so far as most of the switchmen are concerned. According to the testimony, all of the regular switchmen are retained, even when times are bad; and the history of the last few years shows that an increase once granted to railway employees remains.

"Again, in many lines of industry, where the workmen are under the immediate personal supervision of the employers and where the nature of the industry is such that, through careful time studies, some of the modern efficiency methods can be employed, it may be possible for people working eight hours, under a new system, so to increase their efficiency as to accomplish as much as they earlier accomplished in ten hours. While it has been testified that, with the hearty co-operation of switchmen and yardmaster, in one case the efficiency of the switchmen, on a test of the eight-hour system for a period of two months, was materially increased, it was not increased to the extent of the 25 per cent needed to cover the decrease in time, nor was there any guarantee that such increased efficiency would continue, had the system been regularly adopted. With the exception of this one experiment, made under most exceptional conditions, the testimony was unanimous to the effect that the efficiency of

increased, so that the added burden of the shorter hours would fall almost entirely upon the railroads.

"Taking all of these circumstances into consideration, the increase in rate has seemed, to the majority of the arbitrators, likely to serve the interests of the public."

THE TREND OF RAILWAY EARNINGS IN THE YEAR 1916

By Julius H. Parmelee
Statistician, Bureau of Railway Economics

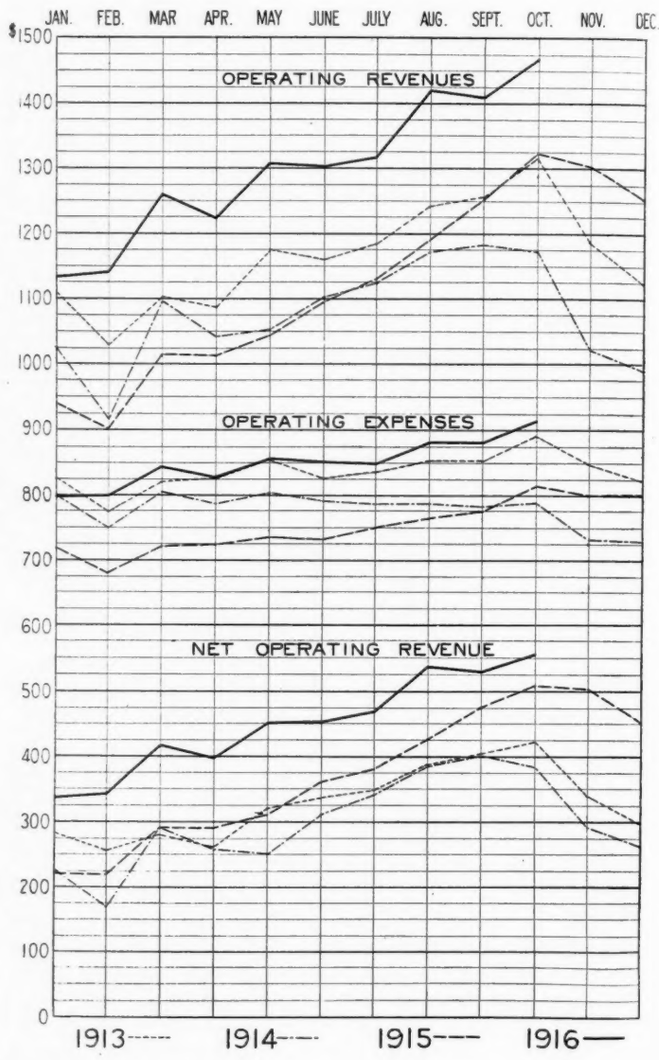
Nineteen sixteen was a record-breaker in the matter of railway earnings. Whether considered from the point of view of the fiscal year ended June 30, or of the calendar year now just closing, both the gross and the net revenues of the steam railways of the United States have been the largest in their history. For the fiscal year 1916 the gross revenues of steam roads having annual operating revenues above one million dollars amounted to $3,396,808,234. This was greater by half a billion dollars, or $508,000,000, than their revenues during the lean year of 1915. Compared with 1913, the last record or peak year, the revenues of 1916 showed an increase of more than a quarter billion dollars, or $261,000,000. Similarly, the net revenues of the million-dollar railways in 1916 was the greatest in history, amounting to $1,176,804,001. This was an increase of nearly a third of a billion, or $319,000,000 over 1915, and an increase of $233,000,000 over the previous record year of 1913. The million-dollar roads operate over 90 per cent of the total railway mileage, and earn over 95 per cent of the total railway revenues; their returns are therefore fully representative of railway operations as a whole.

Operating expenses in 1916 were also on the increase. They amounted to $2,220,004,233, which represents the greatest annual expenditures in the history of American railways, although only slightly greater than their expenses in 1914, which was the next largest year in the matter of expenses. The increase over 1915 was $189,000,000. That the railways were able in 1916 to keep their expenditures down to within a million dollars of those for 1914, although they were doing considerably more business, speaks well for the economy and efficiency with which the railway managers were handling their properties in 1916. In fact, when reduced to a per mile basis, the operating expenses in 1916 were actually less than in 1914. A large part of the economy, however, was exercised in the maintenance of way account. Maintenance of way expenses in 1916 were cut by $14,000,000, traffic and transportation expenses by $9,000,000, and general expenses by $4,000,000. There was an increase of $26,000,000 in maintenance of equipment.

While the business done by the railways in 1916, as measured in ton-miles and passenger-miles, was greater than ever before, the increase was most marked in the matter of freight. Ton-miles increased about 25 per cent over 1915, and passenger-miles about 6 per cent; freight traffic was appreciably greater in 1916 than in 1913, while passenger traffic was about the same as in the heavy years of 1913 and 1914.

Table I presents a statement of mileage, revenues, expenses, net revenue, taxes and operating income for the fiscal years 1913 to 1916, showing the amount and rate of increase or decrease per mile in 1916 as compared with each of the other years. From this table it develops that the railways earned $2,140 more per mile in 1916 than in 1915, or 16.9 per cent; that their expenses per mile were greater by $769 per mile, or 8.6 per cent; that their net revenue per mile increased 8.4 per cent; and that operating income per mile was greater by $1,321, or 41.7 per cent. Compared with the peak year of 1913, operating revenues in 1916 per mile increased 5.7 per cent, net revenue per mile increased 21.6 per cent, while operating income per mile was greater by 22.4 per cent. Taxes per mile were greater than in 1913 by 15.7 per cent.

Table II gives the revenues and expenses per mile, by months, for the calendar years 1913 to 1915, inclusive, and for the ten months of 1916 for which information is available at the present writing. The trend of operating revenues per mile, as set forth in this table, presents a most interesting



Comparative Chart of Earnings and Expenses per Mile of Line

picture of changes in the general business situation since the opening of the great war in Europe. War broke out at the beginning of August, 1914. American railways first began to feel the effects of war conditions in October, when there was a slight decrease in revenues per mile as compared with September, although normally a considerable increase in traffic would have been expected. This decrease in per mile earnings went on through November and December, 1914, and January and February, 1915, each month showing a decrease under the corresponding month of the previous year and a decided decrease as compared with the month just preceding. In March, 1915, there was an upturn, although not enough to bring revenues up to the level of 1914, and the improvement continued until July, when, for the first time, revenues per mile were slightly greater than in the corresponding month of 1914. The remaining months of the the switchmen on the shorter work day would be only slightly

calendar year 1915 showed continually mounting increases over the corresponding months of 1914. Bearing in mind this sharp distinction between the first six months and the second six months of 1915, we come now to a consideration of the monthly returns for the calendar year 1916. Revenues per mile for January, 1916, showed an increase of 20.7 per cent over 1915. The rate of increase ranged from 20 to 27 per cent during the first five months of 1916, fell slightly below 20 per cent in June, fell to 16.3 per cent in July, came back a little in August, dropped to 12.6 per cent in September, and to 11 per cent in October. In other words, while the latter months of 1916 showed appreciable increases over the corresponding months of 1915, the increase was at a decreasing rate from month to month. This was due in part to the fact, already mentioned, that the latter half of 1915 showed better results than the first half. Even so, however, the decided slackening of the pace in the latter months of 1916 is significant, and this in spite of the fact that the per mile revenues of August, September and October, 1916, were the largest of any three months in American railway history.

Operating expenses per mile showed a somewhat variable tendency during the calendar year 1916, but the general trend was upward. Railway managers were evidently doing their best to keep down expenses, in face of rising prices of material and increasing threats of wage advances. In spite of this, the rate of increase in expenses, which in January was only one-half as great as the rate of increase in revenues, gradually approached a level with the latter, until in September we find expenses increasing relatively faster than

TABLE I—REVENUES AND EXPENSES IN THE AGGREGATE AND PER MILE OF LINE OF STEAM ROADS HAVING ANNUAL OPERATING REVENUES OF $1,000,000 OR OVER: FISCAL YEARS ENDED JUNE 30, 1916, 1915, 1914 AND 1913

Item	1916		1915		1914		1913		Increase or decrease per mile of line 1916 over 1915		Increase or decrease per mile of line 1916 over 1914		Increase or decrease per mile of line 1916 over 1913	
	Amount	Per mile of line	Amount	Per mile of line	Amount	Per mile of line	Amount	Per mile of line	Amt.	Per cent	Amt.	Per cent	Amt.	Per cent
Miles of line operated (average)	229,229	...	227,826	...	225,478	...	223,547	...	...	...	...	...	...	...
Total operating revenues	$3,396,808,234	$14,818	$2,888,448,313	$12,678	$3,053,747,597	$13,543	$3,135,016,158	$14,024	$2,140	16.9	$1,275	9.4	$794	5.7
Total operating expenses	2,220,004,233	9,684	2,031,196,840	8,915	2,219,432,612	9,843	2,191,139,100	9,802	769	8.6	d159	d1.6	d118	d1.2
Net operating revenue	1,176,804,001	5,134	857,251,473	3,763	834,314,985	3,700	943,877,058	4,222	1,371	36.4	1,434	38.7	912	21.6
Taxes	146,754,477	640	134,610,132	591	136,612,209	606	123,655,189	553	49	8.4	34	5.7	87	15.7
Uncollectible railway revenue	807,720	4	650,655	3	.....	...	.....	...	1	...	4	...	4	...
Operating income	1,029,241,804	4,490	721,990,686	3,169	697,702,776	3,094	820,221,869	3,669	1,321	41.7	1,396	45.1	821	22.4

d Decrease.

TABLE II—MONTHLY REVENUES AND EXPENSES PER MILE OF LINE: 1913, 1914, 1915 AND 1916.

Month	Operating Revenues per Mile					Operating Expenses per Mile					Net Operating Revenue per Mile				
	1913	1914	1915	1916 Amount	1916 Per cent increase or decrease from 1915	1913	1914	1915	1916 Amount	1916 Per cent increase or decrease from 1915	1913	1914	1915	1916 Amount	1916 Per cent increase or decrease from 1915
January	$1,109	$1,026	$939	$1,133	20.7	$826	$799	$718	$797	11.1	$283	$227	$221	$336	51.9
February	1,031	918	900	1,140	26.8	774	750	680	800	17.7	257	169	220	340	54.8
March	1,103	1,097	1,015	1,260	24.1	822	805	722	844	16.8	281	292	293	416	41.9
April	1,087	1,043	1,013	1,223	20.8	826	786	724	827	14.3	261	257	289	396	37.0
May	1,175	1,053	1,044	1,307	25.2	855	803	735	857	16.6	320	250	309	450	45.6
June	1,160	1,102	1,094	1,302	19.0	826	791	732	851	16.2	334	311	362	451	24.6
July	1,183	1,124	1,130	1,315	16.3	836	785	750	848	13.1	347	340	380	467	22.7
August	1,241	1,171	1,190	1,418	19.1	853	786	764	882	15.4	387	385	426	536	25.8
September	1,257	1,182	1,251	1,409	12.6	853	781	774	881	13.8	403	401	477	528	10.6
October	1,314	1,171	1,323	1,468	11.0	891	787	815	913	12.0	423	384	508	555	9.2
November	1,186	1,023	1,303	...	...	848	732	800	...	...	338	292	503	...	...
December	1,122	990	1,253	...	...	824	728	802	...	...	298	262	451	...	...

TABLE III—MONTHLY REVENUES AND EXPENSES PER MILE OF LINE, JANUARY TO OCTOBER, 1916, BY DISTRICT

Month of—1916	Eastern District						Southern District						Western District					
	Operating Revenues		Operating Expenses		Net Operating Revenues		Operating Revenues		Operating Expenses		Net Operating Revenues		Operating Revenues		Operating Expenses		Net Operating Revenues	
	Amt. per mile	Per Ct. Inc. or Dec. from 1915	Amt. per mile	Per Ct. Inc. or Dec. from 1915	Amt. per mile	Per Ct. Inc. or Dec. from 1915	Amt. per mile	Per Ct. Inc. or Dec. from 1915	Amt. per mile	Per Ct. Inc. or Dec. from 1915	Amt. per mile	Per Ct. Inc. or Dec. from 1915	Amt. per mile	Per Ct. Inc. or Dec. from 1915	Amt. per mile	Per Ct. Inc. or Dec. from 1915	Amt. per mile	Per Ct. Inc. or Dec. from 1915
January	$2,069	30.0	$1,460	13.7	$669	98.1	$959	20.5	$643	8.9	$316	53.8	$750	11.0	$542	9.1	$217	16.2
February	2,037	35.2	1,461	21.6	576	89.1	971	27.1	642	12.7	329	69.5	784	18.2	548	15.6	236	24.6
March	2,219	27.4	1,553	20.4	666	47.3	1,055	21.5	681	11.7	374	44.7	887	21.8	572	15.1	315	36.2
April	2,195	21.0	1,508	17.1	687	30.4	987	16.2	650	8.1	337	35.9	855	22.7	573	13.7	282	46.2
May	2,370	26.6	1,564	19.3	806	43.4	1,024	22.9	665	11.9	359	50.1	912	24.9	595	15.6	317	47.0
June	2,363	19.8	1,574	20.9	789	17.6	968	18.4	630	6.4	338	49.7	924	18.6	592	14.7	332	26.1
July	2,380	18.3	1,551	17.6	829	19.7	931	10.6	649	8.0	282	17.3	951	16.1	590	10.0	361	27.8
August	2,504	18.1	1,607	19.2	897	16.2	1,028	17.6	675	10.8	353	33.3	1,047	20.9	617	12.8	430	34.7
September	2,451	12.1	1,612	18.0	839	2.3	1,028	11.2	676	9.4	352	14.8	1,057	13.8	614	11.0	443	18.0
October	2,481	8.1	1,669	14.2	812	d 2.5	1,130	13.7	707	7.3	423	26.3	1,122	12.5	639	10.4	483	15.6

d Decrease.

revenues. The same is true of October. As in the case of the fiscal year 1916, such economies as were possible were made principally at the expense of maintenance of way, the rate of increase in this account being lower than the rates of increase in transportation and maintenance of equipment expenses, for all the later months of the year.

Net operating revenue shows a tendency similar to that of gross revenues, but with the variations somewhat exaggerated. From January to May the rate of increase in net revenue per mile, as compared with the corresponding months of 1915, ranged from 37 to 54 per cent. In June there was a sharp drop to 24.6 per cent, in September to 10.6 per cent and in October to 9.2 per cent, the last two being the lowest rates of increase since March, 1915. The cause of the falling rate of increase for the latter months of 1916 was in part the fact that the comparison was with a higher level of net earnings in the latter months of 1915, and in part the higher rate of increase in expenses than in gross revenues, described in the preceding paragraph.

Table III is devoted to the first ten months of the calendar year 1916, and shows the revenues, expenses and net revenue per mile for the eastern, southern and western districts. This table brings out the tendencies in the various sections of the country, tendencies that may be lost to view when the operations of the three districts are presented in combined form. The gross revenues per mile of the eastern railways from January to May were all greater by more than 20 per cent than for the corresponding months of 1915. In February the rate of increase was as high as 35 per cent. In June the rate of increase fell below 20 per cent for the first time, and continued to fall until in October it was only 8.1 per cent. Similarly, net revenue per mile from January to May showed a rate of increase ranging from a high level of 98 per cent, in January, to a low level of 30 per cent, in April. In June, however, there was a sharp break below 20 per cent, in September the rate of increase fell to 2.3 per cent, while in October there was an actual decrease of 2.5 per cent. This was the first month in which the eastern railways showed a decrease in net revenue per mile since January, 1915. The sharp break in net revenue in September and October was due primarily to the considerably greater rate of increase in expenses than in revenues. Among other factors, rising prices were beginning to manifest their influence.

The southern roads showed smaller rates of increase on the whole than in the East, but the increases were more nearly uniform. From January to June, gross revenues per mile ranged from 16 to 27 per cent higher than in 1915; in July the rate of increase dropped to 10.6 per cent, in September was 11.2 per cent, while in October there was a slight recovery to 13.7 per cent. Net revenue per mile remained well above the 1915 level until June, the rate of increase ranging from 69 per cent in February down to 36 per cent in April. The rate of increase broke sharply in July to 17.3 per cent; there was a recovery in August, another break to 14.8 per cent in September, and another recovery to 26.3 per cent in October. Operating expenses per mile were higher in all months than in 1915, but did not in any month increase faster than revenues. In fact, the record of the southern roads in the matter of holding down increases in their expenses is marked.

The western railways showed on the whole a more nearly uniform rate of increase in revenues than either the East or the South. The largest rate of increase during the ten months in gross revenues per mile was 24.9 per cent, in May, while the smallest was 11.0 per cent, in January. The rate of increase for October was 12.5 per cent, which was next to the lowest of any month during the year. The rate of increase in net revenue per mile remained fairly high through August, but there were sharp breaks to 18.0 per cent in September and 15.6 per cent in October. This last was the smallest rate of increase in the whole ten months. As in the South, the rate of increase in expenses per mile was lower throughout than the rate of increase in revenues, but the tendency during the later months of the year was for the upward curve in expenses to rise toward the same level as the upward curve in revenues.

The chart indicates the general results per mile, for the United States as a whole, for the years 1913 to 1916, inclusive. Operating revenues per mile rose almost steadily from January, 1916, to high-water mark in October. Operating expenses per mile showed a similar upward tendency, although the incline is less marked. Net revenue per mile also shows an almost constant increase. The general tendency of net revenue, as compared with 1915, was to show a relatively smaller rate of increase, so that the lines for 1915 and 1916, respectively, were closer together in September than in any preceding month, and in October were still closer.

We have seen how impressively both the fiscal and the calendar year 1916 have been record years, whether considered in the light of business handled or of money earned. To deny or minimize the prosperity of the railways in 1916 would be worse than futile. Two questions, however, present themselves, answers to which may furnish a background against which this relative prosperity of the roads may be more effectively viewed. In the first place, what do the tremendous railway earnings of 1916 mean when related to their even more tremendous investments; and secondly, what do the returns for 1916 augur for 1917 and the future?

As to the rate of return on railway investment, we have some recently issued statistics of Interstate Commerce Commission which throw light on the question. In its annual report to the present session of Congress the Commission included a table showing the investment of the railways in road and equipment and their operating income for a period of twenty-six years, the fiscal years 1891 to 1916, inclusive; also the annual rate of return on investment. The rate of return as computed by the Commission on the larger railways for 1916 was 6.35 per cent. Adjusting it to cover the smaller railways as well, the rate of return on investment in 1916 in found to be about 6.18 per cent, which is comparable with 4.09 per cent for 1915, 4.19 per cent for 1914, and 5.12 per cent for 1913. As a matter of fact, if the railway operating income for 1916 be adjusted so as to exclude net hire of equipment, joint facility, and miscellaneous rental payments, the rate of return would fall from 6.18 per cent to slightly under 6 per cent. Even in the record year 1916, therefore, the railways as a whole earned not more than six per cent on their investment, which does not seem an excessive rate of return.

As to the future, the answer depends largely on the gap between the rate of increase in revenues and in expenses, which we have seen was rapidly closing during the later months of 1916, notably in the East and quite appreciably in the West. Whether this gap will be still further reduced or even closed up in the near future, it is perhaps unwise to prophesy, but there seems to be a slackening in that part of the nation's business which is due directly to the war. Such a slackening, if it continues to develop, coupled with the relative crop failures of 1916, may tend to decrease the amount of certain kinds of traffic offered to the railways. On the other hand, the freight congestion of the past few months has dammed up the flow of considerable traffic that must be released gradually during 1917; furthermore, the generally prosperous business conditions of 1916 have set under way an expansion in the buying and selling of manufactured products, the momentum of which will carry well into 1917, almost regardless of the possible turn of events in Europe. It seems a safe prediction, therefore, that the railways will have their hands full in 1917, from an operating point of view, even if the unexpected should happen and the early cessation of fighting abroad should call for a considerable rearrangement in our economic life. New problems would arise under such a contingency, and a transitional

period would necessarily ensue; but business commitments already entered into would probably keep railway traffic at a high level for some months ahead. There seems a probability of but little slackening in railway traffic during 1917.

There is another side to the shield, however, in that the railways will find it extremely difficult in 1917 so to keep down expenditures as to maintain their net earnings level with those of the year just closing. The signs all point in this direction, as emphasized by the returns of the latter months of 1916. For one thing, the roads will be faced, on the first of January, with a new phase of railway regulation, which will make considerable additions to the cost of operation, with little or no compensating financial advantages. I refer, of course, to the eight-hour legislation of last September, which was made effective as of January 1, 1917. Whatever may be the outcome of the court proceedings and informal conferences now under way, there is little question that the railways will be faced with a considerably larger wage bill next year than in 1916. Furthermore, they are among the largest consumers of coal, iron and steel, ties and other lumber, oil and lubricants, stone, sand, etc., and the steadily increasing prices of materials are sure to make themselves felt in the near future even more decisively than in 1916. It may be, then, that the cautious attitude of many railway executives toward the future is not wholly the result of their psychological inability to grasp the reality of their present good fortune, but is due to well-defined expectations as to the relation of expenses to revenues in the near future. And the record of still future years, in the light of the almost overwhelming problems which the close of the war will eventually thrust upon the United States, is even less clearly defined to the mental vision of the railway manager today.

RECEIVERSHIPS AND FORECLOSURE SALES

From the high water mark of approximately 42,000 miles of railroad in the hands of receivers reached at one time during 1915, there is as of December 31, 1916, 34,559 miles of railroad still in receivers' hands. This is over 13 per cent of the total railroad mileage of the country in bankruptcy at the end of a year, which, measured by most of the standards of business activity, has been the most prosperous in the history of the United States. During 1915 the Wabash, operating 2,514 miles, was sold under foreclosure and taken over by a new company; so that with other readjustments in the calendar year 1915 there was at the beginning of 1916 38,661 miles of road in receivership. During 1916 the St. Louis & San Francisco, operating 4,749 miles of road, some of its subsidiaries operating about 1,000 miles more; the Western Pacific, operating 945 miles; the Atlanta, Birmingham & Atlantic, operating 638 miles, and various small roads, were taken out of the receivers' hands, but this was in part offset by the fact that the Boston & Maine and the Texas & Pacific both went into receivers' hands during 1916.

These two roads were the most important receiverships of 1916, and the causes leading to their bankruptcy are peculiar and are in the nature of something which could not be overcome even by better earnings and more prosperious general business conditions.

The Boston & Maine was forced into a temporary receivership by the failure of the legislatures of Massachusetts, Maine, New Hampshire and Vermont to act in accord to pass legislation which would permit of the reorganization of the Boston & Maine without receivership proceedings, on the one hand, and the failure of the stockholders of the leased lines to co-operate with the directors of the parent company in such a way as to present a united case to the politicians on the other hand. More than half of the mileage of the Boston & Maine is owned by other companies, from which the Boston & Maine leases the lines for operation, paying a rental either in the form of guaranteed dividends on stock of these lines, or on the basis of

FORECLOSURE SALES IN 1916

Name of company	Mileage	Funded debt outstanding	Stock outstanding
[a] Apalachicola Northern	...	.....	.....
[b] Arkansas Southeastern	...	.....	.....
Atlanta, Birmingham & Atlantic	638	$18,533,000	$35,000,000
Beaumont, Sour Lake & Western	119	2,057,825	85,000
Boca & Loyalton	45	412,000	1,200,000
Brownwood North & South	18	91,000	225,000
Catskill Mountain	20	292,600	89,000
Catskill & Tannersville	5	.....	80,000
Chicago, Anamosa & Northern	35	.....	400,000
Columbus & Southern	23	500,000	2,000,000
Crooked Creek Railroad & Coal Co.	18	116,500	112,500
Florida Railway	59	1,180,000	4,000,000
[b] Idaho Southern	...	.....	.....
Iowa & Omaha Short Line	12	.....	.....
Marietta, Columbus & Cleveland	49	255,000	250,000
[c] Muscatine, North & South	...	.....	.....
New Berlin & Winfield	8	33,800	30,000
[d] New Orleans, Fort Jackson & Grand Isle	60	.....	.....
Ohio & Kentucky	40	425,000	300,000
Ohio River & Columbus	24	500,000	501,000
Pittsburgh, Lisbon & Western	27	988,000	5,000,000
Quakertown & Delaware River	15	151,700	180,000
St. Louis & San Francisco	4,749	287,310,928	49,985,762
St. Louis, Brownsville & Mexico	518	12,179,506	500,000
St. Louis, San Francisco & Texas	244	1,188,000	804,000
South Dakota Central	103	820,000	2,130,900
Virginia & Kentucky	5	35,500	119,100
Wabash-Pittsburgh Terminal	63	50,401,834	10,000,000
Western Pacific	946	75,000,000	75,000,000
Wheeling & Lake Erie	512	23,000,000	36,980,400
Totals	8,355	$475,472,193	$227,972,662

[a] Taken out of receivership February 22, 1916, all floating debt having been paid off without any foreclosure proceedings.
[b] Discontinued.
[c] This road was reorganized and name changed to Muscatine, Burlington & Southern, October 1, 1916. No foreclosure.
[d] Went into receivership July 19, 1916, and was sold at foreclosure September 27, 1916.

RECEIVERSHIPS ESTABLISHED IN 1916

Name of company	Mileage	Funded debt outstanding	Stock outstanding
Boston & Maine	2,298	$56,644,060	$42,655,191
Connecticut River	88	4,744,000	3,233,300
Vermont Valley	25	3,800,000	1,000,000
Catskill Mountain	20	292,600	89,000
Catskill & Tannersville	5	.....	80,000
Nevada Short Line	12	.....	.....
Pine Bluff & Northern	10	43,000	160,000
Tennessee & North Carolina	37	465,628	306,100
Texas & Pacific	1,944	55,883,000	38,763,810
Totals	4,439	$121,872,288	$ 86,287,401

SUMMARY OF RECEIVERSHIPS FOR 41 YEARS.

Year	No. of roads	Miles	Bonds and stocks
1876	42	6,662	$467,000,000
1877	38	3,637	220,294,000
1878	27	2,320	92,385,000
1879	12	1,102	39,367,000
1880	13	885	140,265,000
1881	5	110	3,742,000
1882	12	912	39,074,000
1883	11	1,990	108,470,000
1884	37	11,038	714,755,000
1885	44	8,836	385,460,000
1886	13	1,799	70,346,000
1887	9	1,046	90,318,000
1888	22	3,270	186,814,000
1889	22	3,803	99,664,000
1890	26	2,963	105,007,000
1891	26	2,159	84,479,000
1892	36	10,508	357,692,000
1893	74	29,340	1,781,046,000
1894	38	7,025	395,791,000
1895	31	4,089	369,075,000
1896	34	5,441	275,597,000
1897	18	1,537	92,909,000
1898	18	2,069	138,701,000
1899	10	1,019	52,285,000
1900	16	1,165	78,234,000
1901	4	73	1,627,000
1902	5	278	5,835,000
1903	9	229	18,823,000
1904	8	744	36,069,000
1905	10	3,593	176,321,000
1906	6	204	55,042,000
1907	7	317	13,585,000
1908	24	8,009	596,359,000
1909	5	859	78,095,000
1910	7	735	51,427,500
1911	5	2,606	210,606,882
1912	13	3,784	182,112,497
1913	17	9,020	477,780,820
1914	22	4,222	199,571,446
1915	12	20,143	1,070,808,628
1916	9	4,439	208,159,689

a percentage of earnings. The rentals in many cases were higher than net earning power in recent years would warrant. Notwithstanding this fact the parent company could not get along without its leased lines, and therefore made a liberal offer to leased line stockholders to exchange their stock for securities of the Boston & Maine bearing the same rate of interest, but in so doing taking over the title to these leased lines so that a united system of railroads under one ownership would result. If this plan had been carried through and the state legislatures had passed laws permitting other features of the plan to be worked out, the chances are that there would have been no Boston & Maine receivership. Since receivership has taken place, however, the management is wisely endeavoring to lay the foundation for a thoroughgoing organization.

The Texas & Pacific fell between the Goulds and the Missouri Pacific. The St. Louis, Iron Mountain & Southern, controlled by the Missouri Pacific, had lent money to the Texas & Pacific, as did also various bankers and the Gould estate. The St. Louis, Iron Mountain & Southern and its parent company—the Missouri Pacific—being in the hands of a receiver, pressure was brought to bear on the Texas & Pacific for payment of all short-term indebtedness. The Goulds apparently did not desire a receivership, but finally consented to one so that their own interests might be conserved by the courts along with the interests of the St. Louis, Iron Mountain & Southern.

Of the roads sold under foreclosure and taken over by reorganized companies it may be said in general that the reorganizations were more drastic and thoroughgoing than

RAILROADS IN THE HANDS OF RECEIVERS

Name of Road	Mileage	Date of receivership	Bonds of old company	Stock of old company	Total old company securities
Alabama, Tennessee & Northern	195	Nov. 22, 1915	$3,161,000	$6,328,000	$9,489,000
Birmingham, Columbus & St. Andrews	38	.....	250,000	4,500,000	4,750,000
Boston & Maine	2,298	Aug. 29, 1916	56,644,060	42,655,191	99,299,251
Connecticut River	88	Aug. 31, 1916	4,744,000	3,233,300	7,977,300
Vermont Valley	25	Aug. 31, 1916	3,800,000	1,000,000	4,800,000
Boyne City, Gaylord & Alpena	90	Nov. 19, 1913	150,000	501,200	651,200
Cape Girardeau Northern	104	April 14, 1914	1,500,000	110,000	1,610,000
Catskill Mountain	20	Jan., 1916	292,600	89,000	381,600
Catskill & Tannersville	5	Jan., 1916	.....	80,000	80,000
Chicago & Eastern Illinois	1,136	May 27, 1913	62,679,150	18,302,752	80,981,902
Chicago, Anamosa & Northern	35	Feb. 21, 1914	.....	400,000	400,000
Chicago, Peoria & St. Louis	255	July 31, 1914	4,850,000	4,000,000	8,850,000
Chicago, Rock Island & Pacific	7,653	April 20, 1915	234,801,000	74,359,723	309,160,723
Cincinnati, Bluffton & Chicago	53	Mar. 13, 1908	1,500,000	1,125,000	2,625,000
Cincinnati, Hamilton & Dayton	622	July 2, 1914	49,607,000	8,248,175	57,855,175
Clarksburg Northern	13	.....	454,000	260,000	714,000
Colorado Midland	338	Dec. 13, 1912	9,469,000	8,376,100	17,845,100
Crooked Creek Railroad & Coal Co.	18	July 22, 1915	116,500	112,500	229,000
Dansville & Mt. Morris	15	June 1894	150,000	50,000	200,000
Denver, Laramie & Northwestern	57	June 12, 1912	808,000	25,660,900	26,468,900
Elberton & Eastern	22	.....	300,000	200,000	500,000
Elkin & Allegheny	17	.....	480,000	476,300	956,300
Evansville & Indianapolis	146	.....	2,500,000	2,000,000	4,500,000
Florida, Alabama & Gulf	26	Feb. 27, 1914	500,000	150,000	650,000
Florida Railway	59	June 25, 1915	1,189,965	1,166,000	2,355,965
Ft. Smith & Western	250	Oct. 9, 1915	5,833,000	5,000,000	10,833,000
Georgia & Florida	320	Mar. 27, 1915	8,452,000	8,750,000	17,202,000
Gould Southwestern	18	April 14, 1914	.....	51,000	51,000
Greenville Northwestern	12	1915	.....	.....	.....
Houston & Brazos Valley	28	Nov., 1915	420,000	24,000	444,000
International & Great Northern	1,160	Aug. 11, 1914	26,347,000	4,822,000	31,169,000
Kansas City & Memphis	56	July 18, 1914	862,000	852,000	1,714,000
Leavenworth & Topeka	56	.....	250,000	50,000	300,000
Liberty White	50	Nov. 12, 1914	.....	300,000	300,000
Louisiana & North West	121	Aug. 23, 1913	2,250,000	2,300,000	4,550,000
Macon & Birmingham	97	Feb. 1, 1908	500,000	500,000	1,000,000
Marietta, Columbus & Cleveland	49	July 10, 1914	250,000	250,000	500,000
Missouri & North Arkansas	365	April 1, 1912	8,340,000	8,340,000	16,680,000
Missouri, Kansas & Texas	1,744	Sept. 27 1915	101,728,750	76,283,257	178,012,007
Missouri, Kansas & Texas of Texas	1,792	Sept. 27, 1915	35,638,054	10,152,500	45,790,554
Missouri, Oklahoma & Gulf	334	Dec. 12, 1912	9,300,347	8,474,000	17,774,347
Missouri Pacific	3,931	July, 1915	160,381,500	82,841,085	243,222,585
St. Louis, Iron Mountain & Southern	3,555	July, 1915	142,644,120	44,394,739	187,038,859
Nevada Short Line	12	Jan., 1916	.....	.....	.....
New Orleans, Mobile & Chicago*	403	Dec. 19, 1913	.....	.....	.....
Orangeburg Railway	17	.....	.....	.....	.....
Pacific & Idaho Northern	90	Sept. 4, 1915	2,646,911	2,929,800	5,576,711
Pere Marquette	2,249	April 5, 1912	72,412,942	26,327,210	98,740,152
Pine Bluff & Northern	10	Feb. 9, 1916	43,000	160,000	203,000
Pine Bluff, Sheridan & Southern	14	.....	92,000	1,505	93,505
Pittsburg, Shawmut & Northern	184	Aug. 1, 1905	14,491,600	15,000,000	29,491,600
Rome & Northern	23	Feb. 28, 1911	.....	1,000,000	1,000,000
St. Louis & Missouri Southern	8	.....	.....	.....	.....
St. Louis, El Reno & Western	42	Oct. 9, 1915	817,000	970,800	1,787,800
San Antonio, Fredericksburg & Northern	25	Oct. 28, 1914	153,352	30,000	183,352
San Antonio, Uvalde & Gulf	316	Aug., 1914	4,413,000	280,000	4,693,000
Sharpsville Railroad	21	Jan. 20, 1897	68,779	350,000	418,779
Tennessee & North Carolina	37	Sept. 14, 1916	465,628	306,100	771,728
Tennessee Central †	294	Dec. 31, 1912	12,232,900	7,941,450	20,174,350
Tennessee Railway	61	July 1, 1913	1,129,000	1,000,000	2,129,000
Texas & Pacific	1,944	Nov., 1916	55,883,000	38,763,810	94,646,810
Toledo, St. Louis & Western	451	Oct. 22, 1914	27,602,000	19,947,600	47,549,600
Trinity & Brazos Valley	315	June 16, 1914	8,760,000	304,000	9,064,000
Valdosta, Moultrie & Western ‡	42	Aug. 23, 1913	300,000	100,000	400,000
Virginia & Kentucky	5	Jan. 1, 1914	35,500	119,110	154,610
Wabash, Chester & Western	65	July 15, 1914	690,000	1,250,000	1,940,000
Watauga & Yadkin River	29	Nov. 12, 1914	.....	3,138,600	3,138,600
Wheeling & Lake Erie ¶	512	June 8, 1908	25,053,000	36,980,400	62,033,400
Wisconsin & Michigan	124	Jan. 15, 1912	3,518,245	1,488,200	5,006,445
Totals	34,559		$1,173,950,903	$615,157,307	$1,789,108,210

Note.—The total mileage of roads in the hands of receivers is as nearly accurate as correspondence with receivers and officers of the roads can get it. The figures for the total of bonds and stocks are only approximate, since in some cases information was refused on the ground that the courts were now in the process of determining disputed questions, or for some other reason.

Note.—The Wabash Pittsburgh Terminal is not included in the above list of roads in the hands of receivers because it was sold under foreclosure and unless something unforeseen prevents will be out of the hands of receivers before December 31, although some technical delay might occur which would make it necessary for the receiver to remain in charge for a day or so longer.

* The New Orleans, Mobile & Chicago will be taken over by the Gulf, Mobile & Northern, the new company organized to operate the property, on January 1, 1917.

† The Tennessee Central is to be sold February 15, 1917.

‡ The Valdosta, Moultrie & Western is to be sold January 20, 1917.

¶ The Wheeling & Lake Erie is shown also in the table showing foreclosure sales because it was sold under foreclosure, but up to December 31 the receiver has not turned the property over to a reorganized company.

those of 1896, the last period of widespread receivership and reorganization of railroads. The St. Louis & San Francisco had been immensely improved by the receivers both in physical condition and in organization, and the new company started operation with the receiver who had been in charge of operation as president. The Western Pacific, which was sold under foreclosure, had its securities drastically cut down. The new company starts operation with very low fixed charges, only about $1,000 per mile, but without as yet having developed any new source of traffic. It was lack of traffic which was the principal cause of the Western Pacific's receivership.

SUMMARY OF FORECLOSURE SALES IN 41 YEARS

Year	No. of roads	Miles	Bonds and stocks
1876	30	3,840	$217,848,000
1877	54	3,875	198,984,000
1878	48	3,906	311,631,000
1879	65	4,909	243,288,000
1880	31	3,775	263,882,000
1881	29	2,617	137,923,000
1882	16	867	65,426,000
1883	18	1,354	47,100,000
1884	15	710	23,504,000
1885	22	3,156	278,394,000
1886	45	7,687	374,109,000
1887	31	5,478	328,181,000
1888	19	1,596	64,555,000
1889	25	2,930	137,815,000
1890	29	3,825	182,495,000
1891	21	3,223	169,069,000
1892	28	1,922	95,898,000
1893	25	1,613	79,924,000
1894	42	5,643	318,999,000
1895	52	12,831	761,791,000
1896	58	13,730	1,150,377,000
1897	42	6,675	517,680,000
1898	47	6,054	252,910,000
1899	32	4,294	267,534,000
1900	24	3,477	190,374,000
1901	17	1,139	85,808,000
1902	20	693	39,788,000
1903	13	555	15,885,000
1904	13	524	28,266,000
1905	6	679	20,307,000
1906	8	262	10,400,000
1907	6	114	13,777,000
1908	3	138	2,547,000
1909	12	2,629	250,033,000
1910	17	1,100	93,660,109
1911	13	1,386	40,741,453
1912	12	661	25,910,990
1913	6	1,159	86,163,850
1914	9	1,470	83,189,500
1915	11	3,914	285,258,782
1916	26	8,355	703,444,855

TRAIN OPERATION ON THE EAST INDIAN RAILWAY

Until recently the traffic on the East Indian Railway has been handled without any officer corresponding to the American train despatcher, dependence being placed entirely on the station "masters" or agents, using block instruments on single-track lines. It has been found that under this system frequent unnecessary delays to freight trains on single-track resulted from the desire of the agents to avoid the necessity of explaining delays to passenger trains. It also resulted in long discussions by telephone or otherwise between adjacent stations when both wanted to send a train over the intermediate section, and occasionally differences of opinion arose between the agent and the train crew when the latter felt that they had a grievance in being unnecessarily detained.

In order to relieve this situation, a centralized control system has been installed in several instances. The movement of trains is placed under the control of an officer called a train controller who directs the station masters by telephone as to which train may be held and which sent forward. The system differs only slightly from that in use on many double-track lines in England where controllers or despatchers direct block operators as to the movements of trains. On the Indian railways the station masters direct the signalmen as to the throwing of switches and setting of signals.

On the single-track line between Allahabad and Tundla, a distance of 262.5 miles, traffic consists of 21 trains each way in 24 hours, freight trains having a length of about 1500 ft. with a possible load of 850 tons, and the passenger trains consisting in some cases of 12 coaches. This section is divided into four control districts, ranging in length from 57 miles to 86 miles, each in charge of a controller throughout the 24 hours, these men working in three shifts of eight hours each. In place of the train sheet in use by American despatchers, these Indian railway controllers make use of a plug board and a graphic sheet or chart. When a train enters the section, the controller takes a plug from the board and inserts it in a socket on the diagram corresponding to the terminal station. As it progresses from station to station its arrival and departure are reported by telephone to the controller who shifts the plug correspondingly. Each plug is marked with the number of the train it represents, and its color indicates the class of the train. A station is not permitted to accept or despatch a train without an order from the controller, but ordinary single-track block operation remains in force. When a train is to be side-tracked, the controller instructs the station as to which siding is to be used, and as long as the train remains on that siding, its plug on the controller's board is left at that point.

The permanent record of the movement of trains is made on a chart or printed form showing the list of stations in a column at the left, and having vertical rulings representing five-minute intervals for a period of eight hours and a horizontal line opposite each station. Different colored pencils are used for different classes of trains with which lines are drawn across this diagram, the intersections of these lines with the horizontal lines indicating the time at which each train passed the given stations. As each chart represents eight hours' work, the three charts each day form a complete record for the district superintendent. It was formerly necessary to require a report from each station daily, of the time of arrival and departure of each train.

The installation of this system has effected important operating economies. The number of trains operated has increased 5 to 10 per cent, as indicated by a number of monthly summaries, the increase in the number of through freight trains for these periods being 15 to 35 per cent. In spite of this increased number of trains, the average time on the road from these monthly records was decreased from 10 to 15 per cent. The cost of the installation on this 262.5 miles was $8,200, not including the line wires which were installed by the government telegraph department. The annual cost of operation, including rental on these line wires, is about $18,670 or $2.92 for each train operated over the district.

TRANS-ANDINE RAILROAD OF CHILE.—The Department of Public Works of Valparaiso has again seriously taken under consideration the proposition of constructing the Chilian end of a new trans-Andine railway. The line, which official reports say will be built at the earliest possible moment, will connect the Argentine port of Bahia Blanca with Lebu and will cross the Andes in the foreign regions of Lonquimay. The Argentine end of the new transcontinental has been completed to within thirty kilometers of the Chilian frontier, where work was halted to await a like development on the western slope of the Andes. At present semi-weekly trains are running regularly between Buenos Ayres and Valparaiso over the existing transandine road, which crosses the great plateau through the Uspallata Pass, 12,000 feet above the level of the sea. The twice-a-week service, which was maintained before the great war, was discontinued until a fortnight ago, when it was resumed because traffic across the Panama Canal has created a profitable passenger service for the South American transcontinental.

Railway Construction Statistics for 1916

Total Mileage of New Lines Built in the United States Is Somewhat Greater Than of Last Year

DURING 1916, 1,098.41 miles of new lines were built in the United States. New second track amounted to 312.31 miles, with additional third, fourth and other main tracks to the extent of 31.06 miles. While the total mileage of new lines is considerably more than that of last year, it is still less than for any other year since 1864. The additional mileage of multiple tracks is less than for last year.

In Canada the mileage of new lines built is 290.04, with 7.09 miles of additional second track. This compares with 718 for last year and a maximum of 3,013 which was reached in 1913. An addition of 50 miles of completed line is reported for the government railway of the United States in Alaska, which, with the total of 34 miles reported last year, gives a total completed length of this road of 84 miles.

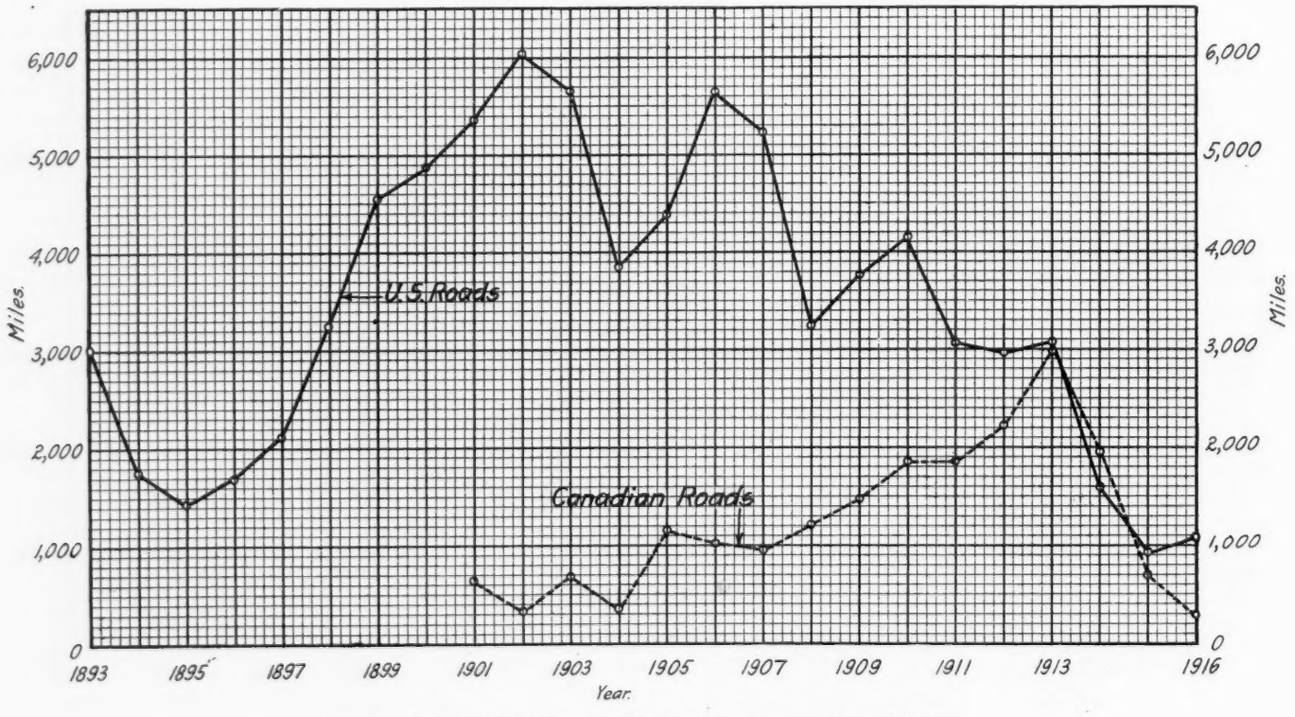
The figures of new construction by years in the United States, beginning with 1893, are as follows:

1893	3,024	1905	4,388
1894	1,760	1906	5,623
1895	1,420	1907	5,212
1896	1,692	1908	3,214
1897	2,109	1909	3,748
1898	3,265	1910	4,122
1899	4,569	1911	3,066
1900	4,894	1912	2,997
1901	5,368	1913	3,071
1902	6,026	1914	1,532
1903	5,652	1915	933
1904	3,832	1916	1,098

Reference to the tables of new mileage by states shows no new mileage reported by 14 states, while less than 3 miles of additional lines is reported for 4 more, and less than 10 miles of new line is reported for each of 5 states. In New England only 1 mile of new line was built and this was in Massachusetts. Montana leads with 99.36 miles, with Kansas second, with 96.31 miles, South Carolina third, with 91.76 miles and California fourth with 78.77 miles. These four states, with Oregon, Washington and Georgia contain nearly half of the new mileage built in the entire United States, while the three Pacific coast states have the highest record for a single group with a total of 200.22 miles.

In the southwestern and mountain states, with their great expanses of undeveloped territory, a total of only 9 states, excluding Montana, show an aggregate of only 73.01 miles of new line, of which not more than 23 miles was built in a single state. No new mileage was reported for either Nevada or Utah and less than two miles for New Mexico and for Colorado. In the north central group of states, Kansas shows additional mileage of 96.31 miles, Michigan 37 miles and North Dakota 36.94 miles. The remaining states in this group, 9 in all, produced 39 miles of new line.

The longest continuous line built during the year was the Charleston Southern (Seaboard Air Line) from Charleston to the Georgia state line, 88 miles. The next longest is the Chicago, Milwaukee & St. Paul's line from Great Falls, Mont., to Agawam, 66.07 miles. Almost one third of all the second track completed in the United States during 1916 is on the Southern in Virginia, North Carolina, South Carolina and Georgia, a total of 98.44 miles. The largest part of this is 55.14 miles in Virginia, giving this state the largest mileage of new second track built in the year, 82.69 miles. The second state in point of new second track is Illinois, with 36.15 miles.



Curves of United States and Canadian Construction Mileage.

Although railway activity, as judged by the number of miles of new and multiple track built, would seem very small, it does not represent accurately the actual amount of activity in railway construction for the reason that the roads are spending a continually larger proportion of their annual construction appropriations for additions and betterments not represented by additional mileage. Because of this, an in-

novation has been introduced in the construction report of the *Railway Age Gazette* this year in the form of a record of other important improvement work done by the railroads in this country.

A very large proportion of the expenditures falling under this classification has been devoted to grade separation in cities. In Chicago alone, the North Western, the Rock Island, the Illinois Central, the Chicago & Western Indiana, the Michigan Central, the New York Central and the St. Paul have all been actively engaged in work of this kind, which involves a total appropriation for these lines in excess of $15,000,000. Obviously the work under these large appropriations will not all be completed in a single year; consequently many items under this and other classifications will reappear in two or more reports. The Chicago, Milwaukee & St. Paul and the Chicago & North Western are also engaged in extensive track elevation work at Milwaukee. The Grand Trunk and the New York Central have similar work under way at Detroit and the cities of Indianapolis, Ind., Johnstown, Pa., and Columbus, Cleveland, Elyria and Fort Clinton, Ohio, have also committed the railroads to work of this kind. Grade revision work represented an unusually small proportion of the expenditures in 1916, although most of the double track projects reported involve grade improvement.

Engine terminals, shops and freight terminals form a very large portion of the improvement work done. Work was in progress during the year on three freight and engine terminals for the St. Paul, involving an expenditure of over $1,500,000. The Boston & Maine is spending $1,000,000 for a roundhouse and yards at Deerfield, Mass. The New York Central has work under way on yard extensions at West Albany, Utica, and Gardenville, N. Y., and is building shops at Elkhart, Ind., and Ashtabula, Ohio, while at Detroit preliminary work has been done by the same road on a freight yard and engine terminal to cost $5,000,000 ultimately. The Pennsylvania lines are also building a new classification yard at Indianapolis.

Large passenger terminals completed during the year include the Dallas, Tex., and the Macon, Ga., stations and the reconstructed Denver station. New passenger terminals for the Lackawanna and the Lehigh Valley are nearing completion at Buffalo. Preliminary construction work is also in progress on the new union station at Chicago.

Among miscellaneous projects for which no definite classifications can be given, may be mentioned the grain elevators completed by the Chicago & North Western at Chicago and Milwaukee, which, with the yards serving them, involve an expenditure of over $5,000,000. The Duluth & Iron Range is building an ore dock at Two Harbors, Minn., to cost $1,400,000. The Great Northern is making extensions to its snow sheds in the Cascade mountains which, with other improvement work in the same territory, will cost $1,500,000. The North Western has completed an office building at Chicago and the Illinois Central is now building another at the same place, each project involving an expenditure of about $500,000.

In Canada construction projects have been reduced to the minimum. The most important work completed during the year is the five-mile Connaught tunnel. Passenger stations were completed by the Canadian Pacific at North Toronto and at Quebec, and work is now in progress on the Toronto union station, while the new passenger and freight terminal of the Vancouver, Victoria & Eastern at Vancouver, B. C., is nearing completion.

The comparative amounts of various classes of new tracks built and other important improvement work under way during 1916 are shown below by states.

NEW TRACK BUILT IN 1916.

UNITED STATES—	No. Cos. building	Miles: First track	Second track	Third track	Fourth or more track	Total
Alabama	4	33.50	2.50	.. ..	.....	36.00
Alaska	1	50.00	.....	.....	.....	50.00
Arizona	1	8.50	.....	.....	.....	8.50
Arkansas	7	13.21	1.36	.....	.....	14.57
California	5	78.77	.....	.....	.....	78.77
Colorado	1	1.80	.....	.....	.....	1.80
Connecticut	..	.....	.55	8.72	5.02	14.29
Florida	5	44.05	.....	.....	.....	44.05
Georgia	3	52.50	26.06	.....	.....	78.56
Idaho	2	19.59	.....	.....	.....	19.59
Illinois	3	10.11	36.15	.25	.14	46.65
Indiana	..	.....	14.38	.....	.....	14.38
Kansas	3	96.31	.....	.....	.....	96.31
Kentucky	1	24.00	2.26	.....	.....	26.26
Louisiana	2	29.81	.....	.....	.....	29.81
Maryland	1	3.50	5.62	.....	.....	9.12
Massachusetts	1	1.00	.....	.....	.....	1.00
Michigan	3	37.00	19.31	.....	.....	56.31
Minnesota	2	10.20	14.90	.....	.....	25.10
Mississippi	4	36.90	19.00	.....	.....	55.90
Missouri	..	.....	3.00	.....	.....	3.00
Montana	3	99.36	.....	.....	.....	99.36
New Jersey	3	2.56	.89	.....	2.02	5.47
New Mexico	1	1.46	.....	.....	.....	1.46
New York	3	5.63	.68	6.17	4.32	16.80
North Carolina	3	23.00	6.50	.....	.....	29.50
North Dakota	2	36.94	.....	.....	.....	36.94
Ohio	2	7.10	25.75	2.06	1.76	36.67
Oklahoma	3	22.80	6.19	.....	.....	28.99
Oregon	4	65.80	1.75	.....	.....	67.55
Pennsylvania	10	43.16	6.20	.14	.46	49.96
South Carolina	2	91.76	12.20	.....	.....	103.96
South Dakota	..	.....	10.30	.....	.....	10.30
Tennessee	4	19.47	4.02	.....	.....	23.49
Texas	3	10.86	.....	.....	.....	10.86
Utah	..	.....	2.90	.....	.....	2.90
Virginia	3	14.58	82.69	.....	.....	97.27
Washington	5	55.65	.....	.....	.....	55.65
West Virginia	4	28.27	.....	.....	.....	28.27
Wisconsin	3	11.26	7.15	.....	.....	18.41
Wyoming	1	8.00	.....	.....	.....	8.00
Totals	108	1098.41	312.31	17.34	13.72	1441.78
Canada	11	290.04	7.90	.....	.....	297.94
Panama	1	40.00	.....	.....	.....	40.00

NEW TRACK BUILT IN 1915.

UNITED STATES—	No. Cos. building	Miles: First track	Second track	Third track	Fourth or more track	Total
Alabama	2	53.15	27.85	.....	.....	81.00
Alaska	1	34.80	.....	.....	.....	34.80
Arizona	2	50.00	.....	.....	.....	50.00
Arkansas	1	19.00	1.00	.....	.....	20.00
California	4	32.00	.....	.....	.....	32.00
Colorado	3	4.73	.....	.....	.....	4.73
Florida	6	38.65	.....	.....	.....	38.65
Georgia	5	31.64	.....	.....	.....	31.64
Idaho	..	.....	1.75	.....	.....	1.75
Illinois	4	6.90	24.78	.....	.....	31.68
Iowa	..	.....	3.43	.....	.....	3.43
Kansas	4	58.56	4.09	.....	.....	62.65
Kentucky	3	48.89	6.92	.....	.....	55.81
Maine	1	1.33	.....	.....	.....	1.33
Maryland	2	3.40	4.95	.....	.....	8.35
Massachusetts	2	2.00	.....	.....	.....	2.00
Michigan	2	18.50	1.00	.....	.....	19.50
Minnesota	4	46.76	28.18	.....	.....	74.94
Mississippi	1	3.50	13.25	.....	.....	16.75
Missouri	1	.16	3.85	.....	.....	4.01
Montana	1	8.51	.....	.....	.....	8.51
Nebraska	1	1.25	.....	.....	.....	1.25
Nevada	1	7.00	.....	.....	.....	7.00
New Jersey	1	.66	2.00	.....	.....	2.66
New Mexico	1	3.66	.....	.....	.....	3.66
New York	3	2.84	13.84	9.27	15.97	41.92
North Carolina	3	33.30	39.90	.....	.....	73.20
North Dakota	2	26.29	.....	.....	.....	26.29
Ohio	3	9.30	7.26	.....	.....	16.56
Oklahoma	3	34.74	.....	.....	.....	34.74
Oregon	4	82.70	.....	.....	.....	82.70
Pennsylvania	9	98.37	44.86	26.25	11.94	181.42
Rhode Island	..	.....	.....	.62	.65	1.27
South Carolina	..	.....	1.00	.....	.....	1.00
Tennessee	4	12.15	18.71	.....	.....	30.86
Texas	2	4.40	.50	.....	.....	4.90
Utah	1	14.95	7.76	.....	.....	22.71
Virginia	2	17.80	81.03	.....	.....	98.83
Washington	6	70.88	9.27	.....	.....	80.15
West Virginia	7	13.78	1.32	.....	.....	15.10
Wisconsin	1	29.32	7.78	.....	.....	37.10
Wyoming	1	7.37	.....	.....	.....	7.37
Totals	104	933.24	356.28	36.14	28.56	1,354.22
Canada	17	718.37	.84	.....	.....	719.21
Mexico	2	36.50	.....	.....	.....	36.50

UNITED STATES

ALABAMA

First Track	Miles	Miles
Chattahoochee Valley—McCulloch to Bleecker	11.00	
Dauphin Island Railway & Harbor Company—From Alabama Port	1.50	
Florida & Alabama—State Line to Whittey	14.00	
Washington & Choctaw—Not specified	7.00	33.50

ALABAMA (*Continued*)

Second Track

	Miles	Miles
Birmingham & Southeastern—From Wheatley	2.50	2.50

Other Important Work Under Construction.

Alabama Great Southern—Building second track between Fort Payne and Flanders, 20 miles.

Florida & Alabama—Building between Whittey and Givens, 1 mile.

ALASKA

First Track	Miles	Miles
United States Government Railway—Between Birchwood and King and 10.4 miles south of Anchorage	50.00	50.00

Other Important Work Under Construction.

United States Government Railway—Building between Kern Creek and Big Rabbit Creek, 33 miles; west of Matanuska Junction to Susitna river crossing, 112 miles; between Nenana and Fairbanks, 56 miles.

ARIZONA

First Track	Miles	Miles
Tucson, Cornelia & Gila Bend—Mile 35 to Ajo	8.50	8.50

ARKANSAS

First Track	Miles	Miles
Arkansas & Memphis Railway Bridge & Terminal Company—State line to Briark	2.06	
Cairo, Truman & Southern—Not specified	1.50	
Combs, Cass & Eastern—Extension to Cass	3.50	
Ft. Smith, Subiaco & Eastern—At Dardanelle	0.15	
Gould Southwestern—Star City to Gould	1.50	
Pine Bluff & Northern—Cullor to Fletcher	2.00	
Yellville Rush & Mineral Belt—Summit to Yellville	2.50	13.21

Second Track

Arkansas & Memphis Railway Bridge & Terminal Co.—State line to Briark	1.36	1.36

Other Important Work Under Construction

Chicago, Rock Island & Pacific—Raising grade of track above high water and increasing waterways, Briark to Hart, cost $163,000, 50 per cent completed.

Fort Smith, Subiaco & Eastern—Building between Scranton and Dardanelle, 26.3 miles.

Yellville, Rush & Mineral Belt—Building between Yellville and Rush, 12.4 miles.

CALIFORNIA

First Track	Miles	Miles
California Southern—Mile post 14 to Blythe	28.43	
Hetch-Hetchy—Between Hetch-Hetchy Junction and Moccosin Creek	15.00	
Nevada-California-Oregon—Clio to Davies Mill	2.84	
Patterson & Western (Narrow Gage)—Between Patterson and Jones Station	23.60	
San Diego & Arizona—Campo west to international boundary	8.90	78.77

Other Important Work Under Construction

Colusa-Hamilton (So. Pac.)—Building between north of Glenn and Hamilton, 12.5 miles.

Hetch Hetchy—Grading completed for double track extension between Moccasin Creek and Hetch Hetchy Junction, 52.6 miles. Contractor, F. Rolandi, San Francisco.

Western Pacific—Relining tunnel, No. 35, cost $100,000, about completed; line change and filling bridge near Blairsden, cost $100,000, 55 per cent completed.

COLORADO

First Track	Miles	Miles
Denver Union Terminal—At terminal	1.80	1.80

Other Important Work Under Construction

Denver Union Terminal Company—Passenger terminal at Denver, cost $849,000, completed.

CONNECTICUT

Second Track	Miles	Miles
New York, New Haven & Hartford—At New Haven	0.55	0.55

Third Track

New York, New Haven & Hartford—Groton to Midway, 2.65 miles; at New Haven, 0.57; Westbrook to Connecticut river, 5.5 miles; total	8.72	8.72

Fourth Track

New York, New Haven & Hartford—Groton to Midway, 0.75 mile; at New Haven, 0.41 mile; Westbrook to Saybrook Jct., 3.86 miles; total	5.02	5.02

Other Important Work Under Construction

New York, New Haven & Hartford—Winthrop Cove relinement at New London, cost $275,000, to be completed February, 1917; Thames river bridge, New London, cost $2,500,000, 25 per cent completed; engine facilities at Danbury, cost $178,535, 35 per cent completed; extension to classification yard at Meriden Junction, cost $184,000, 50 per cent completed; improvements to bridge between Meriden Junction and Waterbury, cost $101,000, 20 per cent completed. Carried out relocation work on about 1.23 miles at New Haven.

FLORIDA

First Track	Miles	Miles
Florida & Alabama—Not specified	1.00	
Florida East Coast—New Smyrna to Maytown	17.25	
Pelham & Havana—Darsey to Havana	5.60	
Seaboard Air Line—Baynard to Walinwa, 10 miles; extension of spur near Bartow, 0.2 mile; total	10.20	
South Florida & Gulf—South of Kenansville	10.00	44.05

Other Important Work Under Construction.

Atlantic Coast Line—Building between Sebring and Venus, 33 miles.

Gulf, Florida & Alabama—Coaling dock at Pensacola, cost $150,000, completed.

GEORGIA

First Track	Miles	Miles
Americus, Hawkinsville & Eastern—In Sumter county	4.50	
Savannah & Northwestern—St. Clair to Georgia Junction	35.00	
Washington & Lincolnton—Washington to Lovelace	13.00	52.50

Second Track

Southern Railway—Cornelia to Gainesville	24.60	
Western & Atlantic (N. C. & St. L.)—Hills Park to Bolton	1.46	26.06

Other Important Work Under Construction.

Macon Terminal Company—Union passenger station at Macon, cost $1,000,000, completed.

IDAHO.

First Track	Miles	Miles
Intermountain Railway at Centerville	.53	
Oregon Short Line—Marshfield to Idahome	19.06	19.59

Other Important Work Under Construction.

Oregon-Washington Railroad & Navigation Co.—Building between Beaver and Ray-Jefferson Mill, 8.8 miles. Contractors, Twohy Bros., Portland, Ore.

ILLINOIS

First Track	Miles	Miles
Alton & Southern—End of track to connection with Chicago, Peoria & St. Louis	5.60	
St. Louis, Iron Mountain & Southern—Depot to junction to top incline	.41	
Illinois Central—From Effingham mile 0 to mile 2:25—2.25 miles; mile 6 to mile 7.85—1.85; total	4.10*	10.11

Second Track

Alton & Southern—Valley Junction northeasterly	1.00	
Chicago, Burlington & Quincy—Southboro to Keyesport, 11.26 miles; Centralia to Woodlawn, 11.97; Sesser to Ziegler Junction, 11.60 miles; total	34.83	
Paducah & Illinois—At Metropolis	0.32	36.15

Third Track

Pennsylvania Company—Northwest and Central Systems—In Chicago	0.25	0.25

Fourth Track

Pennsylvania Company—Northwest and Central Systems—In Chicago	0.14	0.14

* Relocation work takes the place of 4.3 of old line.

Other Important Construction Work

Chicago & Alton—Completed work on River Terminal at East St. Louis, December 1, costing $100,000.

Chicago & Eastern Illinois—New passenger station, rearrangement of freight yard and construction of subway at Danville, cost $257,000, 40 per cent completed; enlargement of shop facilities at Oaklawn, cost $123,000, 58 per cent completed.

Chicago & North Western—Reinforced concrete grain elevator and 17 miles of yard tracks at Chicago, cost $3,850,000, 30 per cent completed; reinforced concrete viaduct at Peoria, jointly with Minneapolis & St. Louis, Chicago, Burlington & Quincy and City of Peoria, cost $120,000, 60 per cent completed; elevation of main and yard tracks on 4 miles at Chicago, cost $1,500,000, 2 per cent completed; bridge at Geneva, cost $160,000, 25 per cent completed; bridge over north branch of Chicago river at Deering, cost $350,000, completed; general office and record building in Ravenswood, Chicago, cost $400,000, completed.

Chicago, Burlington & Quincy—Building bridge over Ohio river at Metropolis, 60 per cent completed; building second track between Steward Junction and Flaggs Center, 8 miles.

Chicago, Milwaukee & St. Paul—Track elevation, Chicago, 4.4 miles, cost $2,500,000, 75 per cent completed.

Chicago, Rock Island & Pacific—Chicago main line track elevation, cost $1,589,200, 70 per cent completed.

Chicago Union Station Company—Union passenger station at Chicago, cost $47,000,000, 5 per cent completed.

Cleveland, Cincinnati, Chicago & St. Louis—Building west of Harrisburg, 8.34 miles. Contractors, Head, Jones & Co., St. Louis, Mo. Rebuilding grain elevator at Sheldon, cost $220,000, completed.

Illinois Central—Reconstruction of Hyde Park subways, Chicago, cost $2,100,000, 25 per cent completed; office building, Dorchester avenue, Chicago, cost $650,000, 30 per cent completed; new freight facilities, East St. Louis, cost $150,000, 30 per cent completed; new mechanical facilities at Freeport, cost $130,000, completed.

Michigan Central—Grade separation and rearrangement of yard tracks at Kensington, cost $240,000, completed.

New York Central—Grade separation at Chicago, cost $7,000,000, 98 per cent completed.

Pennsylvania Lines West—Pennsylvania Company freight terminal at Polk street, Chicago, cost $4,360,000, 40 per cent completed.

Pittsburgh, Cincinnati, Chicago & St. Louis (P. L. W.)—Grade separation at Chicago, cost $4,567,000, 25 per cent completed; new engine house layout and shop facilities at Chicago, cost $373,520, 45 per cent completed.

INDIANA

Second Track	Miles	Miles
Chicago & Eastern Illinois—At Clinton mile post 2 to mile post 5	2.88	
Chicago & Erie (Erie)—Clanricarde to Kouts, 5 miles; Hurlburt to Malones, 4 miles; Palmer to Winfield, 2.5 miles; total	11.50	14.38

Other Important Work Under Construction

Illinois Central—Elevation of tracks at Indianapolis, cost $136,900, 80 per cent completed.

Indianapolis Union Railway—Elevation of all tracks including train shed at Union station, Indianapolis, cost $5,000,000, 10 per cent completed.

Indianapolis & Frankfort (Vandalia)—Building between Bendavis and Frankfort, 41 miles. Contractors, Dunn-McCarthy Co., Chicago.

New York Central—New shops at Elkhart, cost $2,000,000, 10 per cent completed.

Pennsylvania Lines West—Pennsylvania Company building engine facilities at Fort Wayne, cost $150,000, 85 per cent completed.

Pittsburgh, Cincinnati, Chicago & St. Louis (P. L. W.)—Rearrangement and extension of yard and car repair facilities at Richmond, cost $530,000, 15 per cent completed; grade separation and track elevation at Indianapolis, cost $123,000, 40 per cent completed; joint freight terminal yard east of Belt Railway, Indianapolis; eastbound and westbound receiving and classification yards; roundhouse, coal wharf and double track connection, cost $1,726,096, 15 per cent completed; new inbound freight house and tracks at Pennsylvania street, Indianapolis, cost $1,331,004, 90 per cent completed.

Peoria & Eastern—Separation of grades in Indianapolis, cost $161,000, 20 per cent completed.

Toledo, St. Louis & Western—Bridge over Wabash river at Silverwood, City, cost $610,000, 10 per cent completed.

Vandalia—Grade reduction and additional facilities between Frankfort and Logansport, cost $565,000, 25 per cent completed; new classification yard and enlargement of present yard and engine house at Bicknell, cost $150,000, 95 per cent completed.

Iowa

Other Important Work Under Construction

Chicago & North Western—Freight house, office building and yard tracks, joint with Chicago, St. Paul, Minneapolis & Omaha at Sioux City, cost $180.000, completed.

Chicago, Milwaukee & St. Paul—New engine terminal and yard at North McGregor, cost $575,000, 35 per cent completed; new engine terminal at Atkins, cost $635,000, 10 per cent completed; new engine terminal at Sioux City, cost $610,000, 10 per cent completed.

Illinois Central—New Mechanical facilities, Waterloo, cost $171,000, completed.

Kansas

First Track	Miles	Miles
Anthony & Northern—Trousdale to Kinsley, 24 miles; Trousdale to Larned, 26 miles; total	50.00	
Missouri Pacific—At Durand, 0.19 mile; at Yates Center, 0.12; total	0.31	
Salina Northern—Between Lincoln and Osborn	46.00	96.31

Other Important Work Under Construction.

Anthony & Northern—Building from Larned to north line Pawnee county, 21 miles; grading contract let to F. M. Thompson, Larned.

Kentucky

First Track	Miles	Miles
Cumberland & Manchester—Barbourville to Manchester	24.00	24.00
Second Track		
Nashville, Chattanooga & St. Louis—Paducah Union Depot to P. & I. Junction	0.77	
Paducah & Illinois—Between Paducah and Kentucky-Illinois state line	1.49	2.26

Other Important Work Under Construction

Chesapeake & Ohio—Engine terminal at Netherland, cost $105,000, 90 per cent completed.

Chesapeake & Ohio Northern—Building between Limeville and Waverly, Ohio, 26 miles, track laying in progress.

Illinois Central—New mechanical terminal, Louisville, cost $215,000, 20 per cent completed.

Louisville & Nashville—Improvements at DeCoursey yard, cost $429,986, 50 per cent completed; yard at Hazard, cost $109,630, 90 per cent completed.

Louisiana

First Track	Miles	Miles
Gulf, Sabine & Red River Ry. & Navigation Co.—Fields to Francis	29.00	
St. Louis, Iron Mountain & Southern—Ferriday to T. & P. connection	0.81	29.81

Other Important Work Under Construction

Morgan's Louisiana & Texas—New machine and erecting shop at Algiers, cost $236,000, 98 per cent completed

Ouachita & North Western—Building between Clarks and Standard, 10 miles.

Trans-Mississinpi Terminal Company—Terminal improvements at New Orleans including a union passenger, team yard, inbound and outbound freight houses, cost $4,000,000, completed.

Maryland

First Track	Miles	Miles
Baltimore & Ohio—Hagerstown to Security	3.50	3.50
Second Track		
Western Maryland—Edgemont to Pen Mar, 3.52; North Junction to Bissell, 2.10 miles; total	5.62	5.62

Other Important Work Under Construction.

Baltimore & Ohio (Long Fork Railway)—Building from Alphoretta, Ky., to Weeksbury, 25.6 miles; contractors, Bates & Rogers, Chicago. New export pier at Curtis Bay, cost $2,500,000, 90 per cent completed.

Pennsylvania Railroad—Export coal facilities at Canton, Baltimore, including new yards, car dumper, vessel loaders and a reinforced concrete pier, completed.

Massachusetts

First Track	Miles	Miles
Fore River Railroad—At Quincy	1.00	1.00

Other Important Work Under Construction

Boston & Albany—Reinforced concrete arch in Newton, cost $110,000, 50 per cent completed.

Boston & Maine—Yard changes at Ayer, cost $185,000, 5 per cent completed; engine house facilities at East Deerfield, cost $513,000, 16 per cent completed, and extension of yard facilities cost $450,000, 4 per cent completed; freight yard at Lowell, cost $202,000, 3 per cent completed.

New York, New Haven & Hartford—Improvements at Dover street yard engine facilities, Boston, cost $130,350, 13.5 per cent completed.

Southern New England—Building from Palmer, Mass., to Providence, R. I., 75 miles.

Michigan

First Track	Miles	Miles
Boyne City, Gaylord & Alpena—Not specified	3.50	
Detroit, Bay City & Western—Peck to Port Huron	31.00	
East Jordan & Southern—Not specified	2.50	37.00
Second Track		
Chicago, Detroit & Canada Grand Trunk Junction (G. T.)—Milwaukee Junction to point west of Fraser	6.68	
Detroit, Grand Haven & Milwaukee (G. T.)—Milwaukee Junction to Royal Oak, 8.68 miles; through Pontiac, 2.86 miles; total	11.54	
Detroit Terminal—At Detroit	1.09	19.31

Other Important Work Under Construction

Chicago, Detroit & Canada Grand Trunk Junction (Grand Trunk)—Grade separation at Detroit, cost $350,000, 50 per cent completed; new yard midway between Mt. Olivet and Fraser, cost $370,000, 25 per cent completed.

Detroit Terminal Railroad—Building at Detroit 2.11 miles of first and second track; contractor for grading, W. E. Tench, Detroit.

New York Central—Grade separation at Detroit, cost $5,000,000, 22 per cent completed: River Rouge freight yard and engine terminal at Detroit, cost $5,000,000, 10 per cent completed.

Minnesota

First Track	Miles	Miles
Consolidated Vermillion & Extension Company—Burnside Lake (near Robinson) to Semer	5.75	
Duluth, Missabe & Northern—Hull-Rust Junction to Sheridan mine	4.45	10.20
Second Track		
Chicago, Milwaukee & St. Paul—Double track switch to Appleton, 13.1 miles; Junction switch to Ortonville, 1.8 miles; total	14.90	14.90

Other Important Work Under Construction

Chicago, Milwaukee & St. Paul—Track depression, 2.4 miles, at Minneapolis, cost $3,000,000, 96 per cent completed.

Chicago, St. Paul, Minneapolis & Omaha—Bridge over Mississippi river at St. Paul, cost $222,000, completed.

Duluth & Iron Range—Ore docks at Two Harbors, cost $1,400,000, 95 per cent completed; car repair shop at Two Harbors, cost $150,000, 90 per cent completed.

Great Northern—Yards at Northtown, cost $220,000, completed; shops and engine house at Ihlen, cost $170,000, and at Breckenridge, cost $100,000, completed.

Minneapolis & St. Louis—Freight terminal improvements at Minneapolis, cost $145,000, 65 per cent completed, and rebuilding Lake street viaduct, cost $135,000, 75 per cent completed.

Mississippi

First Track	Miles	Miles
Alabama & Mississippi—Between Dueitt and Evanston	19.00	
Batesville Southwestern—Crowden south	.70	
Jackson & Eastern—Union to Sebastopol	14.00	
Meridian & Memphis—At Meridian	3.20	36.90
Second Track		
Chicago, Burlington & Quincy—Forbes to Curzons	5.00	
Jackson & Eastern—Union to Sebastopol	14.00	19.00

Other Important Work Under Construction

Alabama & Vicksburg and Mobile & Ohio—Subway at Meridian, cost $115,000, 50 per cent completed.

Jackson & Eastern—Building between Meridian and A. T. & N. Ry., 27 miles.

Yazoo & Mississippi Valley—Big Black river bridge near Vicksburg, cost $152,000, 30 per cent completed; raising grade above high water on 8.6 miles of track between Yazoo river and Vicksburg, cost $168,000, 80 per cent completed.

Missouri

Second Track	Miles	Miles
Kansas City Terminal Railway—At Kansas City	3.00	3.00

Other Important Work Under Construction

Chicago, Burlington & Quincy—Building bridge over Missouri river at Kansas City to be opened early in 1917.

Kansas City Terminal Railway—Double track connecting line between Kansas City, Mo., and Kansas City, Kan., including bridge, 4.24 miles; work just started by American Bridge Co., Kansas City, Mo.

Kansas City Terminal Railway—Paseo viaduct, cost $140,000, completed.

St. Louis-San Francisco—River front improvements at Cape Girardeau, cost $237,000, 50 per cent completed; mechanical improvements at St. Louis, cost $118,000, 50 per cent completed.

Terminal Railroad Association of St. Louis—Harlem receiving and classification yard, cost $100,000, 30 per cent completed.

Montana

First Track	Miles	Miles
Chicago, Milwaukee & St. Paul—Great Falls to Agawam	66.70	
Great Falls & Teton County (Gt. Nor.)—Bynum to Pendroy	8.66	
Montana Eastern (Gt. Nor.)—Lambert to Richey	24.00	99.36

Other Important Work Under Construction

Chicago, Milwaukee & St. Paul—Building between Grass Range and Winnett, 23.50 miles; Big Blackfoot Railway, building between Big Blackfoot Junction and Clearwater, 22.50 miles.

Great Northern—Change of line at Paola, cost $125,000, 90 per cent completed; shop and engine house at Great Falls, cost $175,000, completed.

Montana Eastern (Gt. Nor.)—Building between Lewistown and Grass Range, 32 miles; contractors, A. Guthrie & Co., Inc., St. Paul, Minn.

Nebraska

Other Important Work Under Construction

Union Pacific—Reconstruction of Missouri river bridge at Omaha, cost $867,000, 35 per cent completed.

NEW JERSEY

First Track	Miles	Miles
Erie—Mile post, 3.25. to mile post, 4.87	1.62	
Lehigh Valley—Extension of Raritan branch	0.62	
West Jersey & Seashore (Penn. R. R.)—Not specified	0.32	2.56
Second Track		
West Jersey & Seashore (Penn. R. R.)—Not specified	0.89	.89
Fifth Track		
Central of New Jersey—Cranford to Westfield, 1.58 miles; at Aldene, 0.30 mile; total	1.88	1.88
Sixth Track		
Central of New Jersey—At Plainfield	0.14	0.14

Other Important Work Under Construction

Erie—Engine terminal at Croxton, cost $650,000, 50 per cent completed.

Lehigh Valley—Ore dock and approach channel, at Constable Hook, completed.

New York, Susquehanna & Western (Erie)—New terminal facilities at Undercliff Junction, cost $150,000, 40 per cent completed; terminal facilities at Undercliff, cost $725,000, 40 per cent completed.

Pennsylvania Railroad—Track elevation at Camden under way.

Philadelphia & Reading—Additional tracks and grade reduction between Glenmoore and Hopewell, cost $400,000, 20 per cent completed.

West Shore (N. Y. C.)—New piers and shop extension at Weehawken, cost $350,000, completed; new ice house, cost $150,000, 40 per cent completed.

NEW MEXICO

First Track	Miles	Miles
El Paso & Northeastern—Jarilla branch extension, 0.32 mile, relocated; end of Jarillo branch to point 1.14 miles beyond, 1.14 miles; total	1.46	1.46

NEW YORK

First Track	Miles	Miles
Cooperstown & Charlotte Valley (D. & H.)—At Cooperstown	0.31	
Lehigh-Buffalo Terminal Co. (L. V.)—At Buffalo	0.68	
New York Connecting—Port Morris to Woodside avenue	4.64	5.63
Second Track		
Lehigh-Buffalo Terminal Co. (L. V.)—At Buffalo	0.68	0.68
Third Track		
Boston & Albany—East Chatham to Chatham	2.14	
New York Central—Beacon to Chelsea	4.03	6.17
Fourth Track		
New York Central—Beacon to Chelsea	4.32	4.32

Other Important Work Under Construction

Baltimore & Ohio—Bulkhead, coal pier and new yard at Arlington, Staten Island, cost $1,200,000, 2 per cent completed.

Delaware, Lackawanna & Western—Terminal improvements at Buffalo including a new passenger station, Bush train shed, warehouse facilities and a concrete and steel viaduct over Main street, complete except viaducts and track system, cost with land $2,500,000; new coal dumper pier and yard at Erie street, Buffalo, completed.

Lehigh Valley—New engine house and tracks at Suspension Bridge nearing completion; new engine terminal and tracks at Manchester nearing completion; new coal car dumper plant at Tifft Farm, completed; new two-story Pier 44, East river, nearing completion; new Pier 8, North river, completed.

Lehigh-Buffalo Terminal Railway (L. V.)—Terminal improvements at Buffalo, including four-story passenger station, Bush train shed, new freight house and driveways, all completed with exception of train shed, which is about 85 per cent completed.

New York Central—Widening and extending Pier 17, New York, cost $180,000, completed; extension of yard at West Albany, cost $500,000, 40 per cent completed; additional tracks and signals at general passenger and freight terminal in Utica, cost $6,000,000, 80 per cent completed; new yard at Gardenville, cost $7,000,000, 25 per cent completed; general station improvements at Poughkeepsie, cost $3,600,000, 64 per cent completed.

NORTH CAROLINA

First Track	Miles	Miles
Linville River—Montezuma to Shulls Mills	14.00	
Madison County—Belva to Hickey's Fork	8.00	
Wautauga & Yadkin River—Darby west	1.00	23.00
Second Track		
Southern Railway—Rocky river to Concord	6.50	6.50

Other Important Work Under Construction

Hiawassee Valley—Grading finished from Andrews to Hainesville, 25 miles.

Madison County Railway—Building between Hickeys Fork and Allegheny, 3 miles; contractors, Patton Bros., Druid.

Norfolk & Western—Freight station and yard shops at Winston-Salem, cost $167,000, completed.

Seaboard Air Line—Grade revision between Hamlet, N. C., and Andrews, S. C., cost $300,000, also grade revision between Raleigh and Hamlet, cost $300,000.

Southern Railway—Building additional tracks in Pomona Yard, and engine facilities; work started on car repair facilities at Spencer.

Statesville Air Line—Building between Statesville and St. Airy, 62 miles, about 22 miles graded.

Watauga & Yadkin River—Building between point west of Darby and Rogers Mill, 7 miles, with company forces.

NORTH DAKOTA

First Track	Miles	Miles
Great Northern—Wildrose to Grenora	36.34	
Midland Continental—At Jamestown	0.60	36.94

Other Important Work Under Construction

Great Northern—Shop and engine house at Minot, cost $100,000, completed.

OHIO

First Track	Miles	Miles
Chesapeake & Ohio Northern—Sciotoville north towards Waverly	4.00	
Newburgh & South Shore—Campbell road to Harvard avenue, 1.2 miles; Harvard avenue to New York Central, 1.1 miles; East 42nd street to Harvard avenue, 0.8 mile; total	3.10	7.10
Second Track		
Cincinnati, Hamilton & Dayton—Miamisburg to South Dayton, 7.00 miles; Carlisle to Miamisburg, 5.00 miles; AX Cabin to Carlisle, 11.00 miles; total	23.00	
Lake Erie & Eastern—In Youngstown	2.75	25.75
Third Track		
Newburgh & South Shore—Independence road to East 42nd street	0.30	
Pittsburgh & Lake Erie—Lowellville to Lowellville Junction	1.76	2.06
Fourth Track		
Pittsburgh & Lake Erie—Lowellville to Lowellville Junction	1.76	1.76

Other Important Work Under Construction

Baltimore & Ohio—Second track and grade crossing elimination at Defiance, cost $530,000, 40 per cent completed.

Baltimore & Ohio Southwestern—Hopple street viaduct at Cincinnati, grading completed, cost $420,000.

Bessemer & Lake Erie—Enlargement of yard at Conneaut Harbor, 35 per cent completed.

Cleveland, Cincinnati, Chicago & St. Louis—Elevation of tracks at Columbus, cost $642,700, 25 per cent completed.

Dayton Union Railway Company—New bridge at Dayton, cost $304,000, 92 per cent completed.

Newburgh & South Shore—Locomotive repair shop at Cleveland, cost $115,000, 90 per cent completed.

New York Central—Ashtabula steel car shops, cost $1,000,000, 30 per cent completed; grade crossing elimination at Cleveland, cost $350,000, 20 per cent completed; Elyria grade separation, cost $1,500,000, 25 per cent completed; grade crossing elimination at Sandusky, cost $170,000, 5 per cent completed; Port Clinton cut-off, grade crossing elimination and change of line, cost $1,250,000, 20 per cent completed; engine terminal and car repair facilities at Air Line Junction yard at Toledo, cost $3,000,000, 90 per cent completed.

Pennsylvania Lines West—Pennsylvania Company, Northwest and Central Systems, relocation of line at Delaware, cost $600,000, 30 per cent completed; rebuilding bridge at Toledo, cost $500,000, completed; coal handling plant, etc., at Sandusky, cost $830,000, 95 per cent completed; grade reduction, Toledo division, at North Columbus, cost $170,000, 40 per cent completed; track elevation at Columbus, cost $125,000, 40 per cent completed; coal handling plant at Ashtabula, cost $170,000, 95 per cent completed; second track and grade reduction at Warren, cost $170,000, 17 per cent completed; freight yard at Stark, cost $251,000, completed; third and fourth tracks east and west of Alliance, cost $1,207,000, 40 per cent completed.

Pittsburgh, Cincinnati, Chicago & St. Louis (P. L. W.)—Track elevation and grade elimination at Cincinnati, cost $519,000, 50 per cent completed; additional yard facilities at Bradford, cost $351,500, 10 per cent completed.

Toledo, St. Louis & Western—Bridge over Maumee river at Grand Rapids, cost $100,000, 40 per cent completed.

Wheeling & Lake Erie—New freight terminal warehouse at Canton, cost $175,000, 80 per cent completed; building between Canton Yard and United Furnace Co., 4 miles.

OKLAHOMA

First Track	Miles	Miles
Midland Valley—Glenpool to Keifer	2.80	
Okmulgee Northern—Deep Fork to Okmulgee	11.00	
Sapulpa & Oil Field—Depew to Shamrock	9.00	22.80
Second Track		
St. Louis-San Francisco—Tulsa stock yards to Red Fork	6.19	6.19

Other Important Work Under Construction

Clinton & Oklahoma Western—Building from Strong City to Cheyenne, 7 miles.

St. Louis-San Francisco—Mechanical facilities at Oklahoma City, cost $180,000, 50 per cent completed; mechanical facilities at West Tulsa, cost $275,000, 40 per cent completed.

OREGON

First Track	Miles	Miles
Columbia & Nehalem River—Not specified	8.00	
Oregon-Washington Railroad & Navigation Co.—Riverside to Crane	33.50	
Valley & Siletz—Spauldings to Siletz Basin, 6 miles; Helmicks to Independence, 7 miles; total	13.00	
Willamette Pacific (So. Pac.)—North of Umpqua river to 10 miles south of Umpqua river	11.30	65.80
Second Track		
Oregon & California (So. Pac.)—In Eugene yard	1.75	1.75

Other Important Work Under Construction

Columbia & Nehalem River—Building from mile 26 to mile 30, 4 miles.

Oregon Washington Railroad & Navigation Company—Terminal facilities at The Dalles, cost $234,000, completed; terminal facilities at Rieth, cost $194,000, completed; lining peninsula tunnel between Portland and North Portland Junction, cost $450,000, 75 per cent completed.

PENNSYLVANIA

First Track	Miles	Miles
East Broad Top Railroad & Coal Company—Woodvale to Alvan	1.20	
Lake Erie, Franklin & Clarion—Alton Junction to mine	1.00	
Lehigh & New England—Palmerton Branch to New Jersey Zinc Co.	0.26	
Midland Pennsylvania—Millersburg to Gratz	15.00	
Pennsylvania Railroad—Not specified	4.55	
Philadelphia, Baltimore & Washington (Penn. R. R.)—Not specified	0.33	

Philadelphia, Bethlehem & New England—Not specified	0.30	
Pittsburg & Shawmut—Cadogan to Freeport	8.42	
Potato Creek—Norwich to West Branch	7.50	
Western Maryland—Somerset Coal Ry.—Coal Junction to mine 123, 2.2 miles; with branch to mine 125, 2.4 miles; total	4.60	43.16
Second Track		
Lehigh Valley—West end of Jeddo No. 4 to Ebervale	0.57	
Philadelphia & Reading—Between Silverton and Westwood	0.12	
Pennsylvania Railroad—Not specified	2.30	
Philadelphia, Baltimore & Washington (Penn. R. R.)—Not specified	0.22	
Pittsburgh, Cincinnati, Chicago & St. Louis (P. L. W.)—On Burgetts Branch	0.63	
Pittsburgh & Lake Erie—Fayette City to E. Roscoe	2.36	6.20
Third Track		
Pittsburgh & Lake Erie—Near Lowellville	0.14	0.14
Fourth Track		
Pennsylvania Company—Northwest and Central Systems—At Lawrence Junction	0.32	
Pittsburgh & Lake Erie—Near Lowellville	0.14	0.46

Other Important Work Under Construction

Baltimore & Ohio—Addition to new freight house at Allegheny, cost $228,000, 2 per cent completed; separation of street and railway grades at Liberty avenue, Pittsburgh, cost $728,000, 95 per cent completed.

Bessemer & Lake Erie—New Alleghany river bridge at Black's Run, 20 per cent completed; K.-O. Junction yard, 5 miles north of Greenville, 47 per cent completed.

Cambria & Indiana—Building between Regan Junction and Nant-y-Glo, 8 miles; contractors, A. S. Anderson & Bro., Inc., Altoona.

Chartiers Southern—Line between Eighty-four and Marianna, 10.22, has grading, masonry and tunnel work completed, bridge superstructure and track laying deferred.

Cumberland Valley—North longitudinal half of double track concrete arch bridge over Susquehanna river at Harrisburg, cost $315,000, masonry completed, track laying 50 per cent completed. Projected and under construction. Second track from Newville to Oakville, 4.9 miles. Work, 75 per cent completed. Grades and alinement between these points are being revised.

East Broad Top Railroad—Mt. Union gravity yard, cost $110,000, 95 per cent completed.

Erie—Renewal of bridge over Susquehanna river just west of Susquehanna station, cost $171,398, 20 per cent completed.

Lehigh & New England—Terminal facilities including yard, shops and engine house at Pen Argyl, cost $650,000, 80 per cent completed.

Midland Pennsylvania—Building between Gratz and Gordon, 25 miles; contractor, Walter S. Aldrich, Audubon, New Jersey.

New York Central—Grade separation at Erie, cost $1,600,000, 10 per cent completed.

Pennsylvania Lines West—Building between Rochester and Kenwood, 4.40 miles.

Pennsylvania Railroad—Track elevation at Johnstown including a new passenger station, a new bridge over the Conemaugh river, retaining walls and elimination of grade crossings, cost with land $3,000,000, nearing completion.

Philadelphia & Reading—Bridge over trolley tracks, Susquehanna river and highway at Sunbury, cost $268,000, 70 per cent completed; bridge over Susquehanna river and avoidance of two grade crossings at Milton, cost $265,000, 70 per cent completed; opening streets in Philadelphia under tracks of Richmond branch and appurtenant work, cost $1,761,000, 10 per cent completed.

Pittsburgh, Cincinnati, Chicago & St. Louis (P. L. W.)—Building between Chester, W. Va., and Raccoon Creek, 1.76 miles in West Virginia and 10.9 miles in Pennsylvania; Ferguson & Edmondson Company, Pittsburgh, contractors for part of the work.

Valzinco Northern—Building from Sulphur Mines near Mineral, Louisa County to Valzinco, 10.5 miles.

Rhode Island

Other Important Work Under Construction

New York, New Haven & Hartford—Improvements to engine house facilities at Providence, cost $225,000, 40 per cent completed.

South Carolina

First Track	Miles	Miles
Atlantic Coast Line—Rumple to Park	3.76	
Charleston Southern (S. A. L.)—Charleston to Georgia state line	88.00	91.76
Second Track		
Southern Railway—Hayne to Duncan	12.20	12.20

Other Important Work Under Construction.

Southern Railway—Work started on important improvements, including new engine terminal facilities and increased yard capacity at Hayne.

South Dakota

Second Track	Miles	Miles
Chicago, Milwaukee & St. Paul—Ortonville to Milbank	10.30	10.30

Tennessee

First Track	Miles	Miles
Arkansas & Memphis Railway Bridge & Terminal Co.—State line to Memphis	0.72	
Morgan & Fentress—Mantrin toward Jamestown	8.00	
Tennessee Railway—Rosedale to Indian Fork	2.75	19.47
Oneida & Western—River crossing to Christian	8.00	
Second Track		
Arkansas & Memphis Railway, Bridge & Terminal Co.—State line to Memphis	0.73	
Morgan & Fentress—Not specified	1.19	
Nashville, Chattanooga & St. Louis—Tantallon to Sherwood	2.1	4.02

Other Important Work Under Construction

Arkansas & Memphis Bridge & Railway Terminal Co.—Building between Memphis and point in Arkansas; work being done by bridge company's forces.

Chicago, Rock Island & Pacific—Subway in Penn street, Memphis, cost $125,000, completed: bridge over Mississippi river and approaches at Memphis, cost $5,250,000, 99 per cent completed.

Illinois Central—Car repair shed, Nonconnah yard, Memphis, cost $150,000, completed.

Morgan & Fentress—Building from Obed Junction towards Jamestown, 10 miles.

Oneida & Western—Building extension of 12 miles from Hagmeyer; contractors, Cook Construction Co.

Union Railway—Freight terminals at Memphis, cost $150,000, 75 per cent completed.

Texas

First Track	Miles	Miles
Paris & Mt. Pleasant—At Mount Pleasant	.13	
Roby & Northern—Between Roby and North Roby	5.00	
Sugar Land—Rotchford to Anchor	5.73	10.86

Other Important Work Under Construction.

Union Terminal Company—Passenger facilities at Dallas including the station building and tracks, coach and engine facilities, double and single track connection with the Santa Fe, and a belt line, cost $5,125,000, completed.

Utah

Second Track	Miles	Miles
Oregon Short Line—Sugar factory to Logan	2.02	
Salt Lake, Garfield & Western—At Ewings	0.88	2.90

Other Important Work Under Construction.

Union Pacific—Building second track between Wahsatch and Emory, 15.22 miles.

Virginia

First Track	Miles	Miles
Big Sandy & Cumberland—Matney to Grundy	9.20	
Chesapeake & Ohio—Peniman Junction to Peniman	4.68	
Interstate Railroad—Exeder Junction to Exeder	.70	14.58
Second Track		
Chesapeake & Ohio—Balcony Falls to Greenlee	3.40	
New York, Philadelphia & Norfolk—Hallwood to Tasley	13.10	
Norfolk & Western—Not specified	11.05	
Southern Railway—Orange to Charlottesville, 27.50 miles; mile post 156.9 to Amherst, 2.10 miles; Sycamore to Gretna, 3.39 miles; Whittles to Dry Fork, 9.20 miles; Dry Fork to Danville, 12.95 miles; total	55.14	82.69

Other Important Work Under Construction.

Southern Railway—Work started on terminal yard at Monroe; grading work let to Langhorne & Langhorne, Lynchburg, Va.; modern engine terminal facilities at Alexandria.

Washington

First Track	Miles	Miles
Bellingham & Northern—Goshen to Welcome	11.30	
Cowlitz, Chehalis & Cascade—Klaus to La Camas	9.30	
Northern Pacific—Grandview to Gibbon, 12.02 miles; Harrah to White Swan, 9.23 miles; total	21.25	
Oregon-Washington Railroad & Navigation Co.—Chamber's Prairie to Olympia	7.40	
Seattle, Port Angeles & Western (C. M. & St. P.)—Majestic to end of track	6.40	55.65

Other Important Work Under Construction

Great Northern—Snow sheds on west slope of Cascade mountains, cost $610,000, and on east slope, cost $415,000, completed; change of line at Embro, cost $200,000, also at Corea, cost $300,000, completed.

West Virginia

First Track	Miles	Miles
Chesapeake & Ohio—At Marshall 0.10 miles from mouth of Peter Cave Fork to mouth of Sulphur Spring branch, 2.00 miles; from mouth of Peter Cave Fork to Silush, 5.10 miles; on Left Hand Fork of Dingess Run branch in Lincoln county, 0.79 miles; from mouth of Beech Creek to end of line in Logan county, 1.56 miles; total	9.55	
Virginian—Stone Coal to Besoco, 6.4 miles; Sullivan to Fireco, 4.7 miles; total	11.10	
Western Maryland-Fairmont Helens Run Railway—Chieftton to Ida May, 4.85 miles, with branch to Carolina, 1.86 miles; total	6.71	
Williamsport, Nessle & Martinsburg—Snyder to Nessle	0.91	28.27

Other Important Work Under Construction.

Baltimore & Ohio—Improved freight facilities at Parkersburg, cost $265,000, 75 per cent completed.

Chesapeake & Ohio—Building between Seth and Jarrolds Valley, 13.3 miles, contractors Boxley Bros., Orange, Va.; Little Marsh Fork to Hazy Creek, 6.5 miles, Rowland Land Co. are handling grading; Pond Fork Railway, Madison to mouth of West Fork, 11.6 miles, contractors Board & Duffield, Charleston; Man to Gilbert Creek, 12.8 miles, contractors Ballard, Herring & Severs, Yancey Mills, Va.; Cow Creek to Conley Creek, 3 miles, Cole & Crane are handling grading.

Virginian Railway—Building Laurel Fork extension of Stone Coal Branch between Besoco and Princewick Mine, 2.84 miles; Piney Creek extension of Winding Gulf Branch between Pemberton and Sullivan, 2.80 miles; Lampkin Branch Spur, between Fireco and Leckie Coal Co. Mine, 1.34 miles.

Western Maryland (Fairmont Bingamon Railway)—Building between Hutchinson and Wyatt, 8.42 miles, contractors, Miller Construction Co., Lock Haven, Pa.

Williamsport, Nessle & Martinsburg—Building between Nessle and Dodd, 3 miles, with company forces.

WISCONSIN

First Track	Miles	Miles
Chicago, St. Paul, Minneapolis & Omaha—Cut-off on Hannibal branch	5.89*	
Hillsboro & Northeastern—Not specified	1.00	
Wisconsin & Northern—Shawano, south	4.37	11.26
Second Track		
Chicago, Burlington & Quincy—Bagley to Wisconsin river	7.15	7.15

*Relocated line.

Other Important Work Under Construction

Chicago & North Western—Elevation of 15 miles of main and yard tracks at Milwaukee, cost $1,200,000, 85 per cent completed; reinforced concrete grain elevator and 5 miles of yard tracks at Milwaukee, cost $920,000, completed; extension of ore docks, 1 and 2 at Ashland, cost $320,000, completed; 12 miles of yard tracks at Ashland, cost $1,340,000, 10 per cent completed.

Chicago, Burlington & Quincy—Building second track between Little and Bluff Siding, 17 miles.

Chicago, Milwaukee & St. Paul—Track elevation at Milwaukee, 1.4 miles, cost $1,500,000, 90 per cent completed; elevator at E. Milwaukee, cost $275,000, 40 per cent completed.

Ettrick & Northern—Building between Blair and Ettrick, 10.20 miles, contractors Matchell & Raichle, Ettrick.

Great Northern—Yards at Superior, cost $100,000, completed.

Interstate Transfer—Building between South Itasca and Wisconsin Point, 4.80 miles, contractors Ord Co., Duluth, Minn.

Waushara Railroad—Building between Red Granite and Poy Sippe, 8.1 miles, grading finished on 45 per cent.

WYOMING

First Track	Miles	Miles
Wyoming Railway—Watt to Healy	8.00	8.00

Other Important Work Under Construction.

Wyoming Railway—Building between Healy and Buffalo, 4.5 miles, contractors Watt Bros. Construction Co., Buffalo, Wyo.

CANADA

First Track	Miles	Miles
Bay Shore & West St. John (Can. Pac.) New Brunswick—Not specified	0.75	
Canadian Pacific (Western Lines)—Pakowki, Alta, to Manyberries, 10.4 miles; Stony Creek to Cambie, 10.5 miles; total	20.90	
Canadian Northern (Western Lines)—In Alberta completing line to Alliance	3.20	
Edmonton, Dunvegan & British Columbia—On main line, 21 miles; Edmonton, Dunvegan Graid Pairie branch, 50 miles; Alberta Great Waterways, 40 miles; Central Canada, Peace River branch, 5 miles; total	116.00	116.00
Grand Trunk Pacific Branch Lines Company—In Saskatchewan, Moose Jaw-Northwest mile 67 to mile 70-3.00 miles; from Regina-Moose Jaw branch at mile 46 to elevator at Moose Jaw, 2.65 miles; total	5.65	
Hudson Bay Railway—In Manitoba	90.00	90.00
Kettle Valley—West of Penticon, B. C.	1.70	
Pacific Great Eastern—Clinton, B. C., to Horse Lake Summit	37.00	
Quebec Central in Province of Quebec—Not specified	0.35	
Toronto, Hamilton & Buffalo—Dunnville, Ont., to Port Maitland	5.00	
Vancouver, Victoria & Eastern (Gt. Nor.)—Kilgard, B. C., to Cannor, 9.32 miles; at Hope, 0.17 mile; total	9.49	290.04
Second Track		
Canadian Pacific—Between Stony Creek and Cambie	7.90	7.90

Other Important Work Under Construction

Canadian Pacific—Work carried out on new station at Quebec and rearrangement of yard at cost of $300,000, also on North Toronto station, at cost of $150,000.

Canadian Pacific—Replacement line 18.6 miles long through the Selkirk mountains, British Columbia, double tracked, including a double track tunnel 5 miles long at Rogers Pass, nearing completion.

Canadian Government Railways—New terminal facilities at Halifax, cost $3,000,000, 85 per cent completed; grain elevator and tracks at St. John, cost $500,000, 5 per cent completed; Prince Edward Island car ferry with terminals, cost $600,000, 20 per cent completed; grain elevator at Transcona, cost $500,000, 5 per cent completed.

Canadian Northern (Western Lines)—Building from Hanna, Alta., southeast, 60 miles, contractor W. J. Connor, Winnipeg, Man.; from Dunblane, Sask., 35 miles and on Thunder Hill Branch, 46 miles, contract let to Western Canada Construction Co., Winnipeg; from Oliver, Alta., north 100 miles, contractor D. F. McArthur, Edmonton, Alta.

Grand Trunk Pacific Branch Lines, Prince Albert Branch—Building from mile 87.4 to mile 111.66, 24.26 miles, grade resurfaced for track laying.

Michigan Central—Roundhouse, coaling plant, etc., at Montrose, Ont., cost $250,000, completed.

St. John & Quebec—Building from Gagetown, N. S., to Westfield, 45 miles, contractors Nova Scotia Construction Co., Halifax.

Toronto Terminal Railway—Union station at Toronto, Ontario, including track and harbor changes, estimated cost $12,000,000. Substructure and steel frame of station building completed.

Vancouver, Victoria & Eastern—Passenger and freight terminal at Vancouver, B. C., cost $500,000, 75 per cent completed.

PANAMA

First Track	Miles	Miles
Chiriqui Railroad—Between Port of Pedregal and Boquete and on branch connecting Potrerillos and La Concepcion	40.00	40.00

Other Important Work Under Construction

Panama Railroad—Dock 7, at Christobal, cost $1,440,000, completed.

ROADS THAT HAVE FAILED TO CO-OPERATE WITH CAR SERVICE COMMISSION

Following its announced intention of using publicity, if necessary, to force some railroads to obey the instructions issued by the Commission on Car Service to relieve the car shortage, the American Railway Association, through the Commission on Car Service, on December 22 made public the following statement, copies of which were sent to all carriers and commercial bodies and to the newspapers:

"To All Members of the American Railway Association:

"The Commission on Car Service, sitting in Washington in daily consultation with the Interstate Commerce Commission, in an effort to relieve the car shortage existing in certain parts of the country, has made four important requests upon the railroads.

"These requests, enumerated below, were formulated in the interest of the public as a whole, and with the knowledge that some roads would be compelled to make sacrifices to comply with them. It was thought, however, that it was absolutely necessary that the railroads themselves should take drastic action, if they were to make any progress in relieving the situation.

"The requests issued by the Commission on Car Service as instructions to all railroads of the country follow:

"1. Request of November 23, 1916, that all railways should at once return to car owners all open top freight cars, either loaded or empty.

"2. Request of November 29, 1916, that all railways which had on their lines more box cars than they owned should, regardless of local requirements, immediately move such excess of cars, loaded or empty, toward the railroad companies which have less than their ownership of cars. A statement of car location as of November 1 was published at that time.

3. Request of December 1, 1916, that railways should deliver to their western and southern connections certain designated percentages of box cars, either loaded or empty, in excess of the number received from those connections.

4. Under date of November 25, a circular was issued, requesting all railroads to send location statements of foreign and system cars on their line, making certain separation reports to be made as of the 1st, 8th, 15th and 23rd of each month.

"These requests have met with generous and prompt response on the part of a number of roads, but some of the lines have shown much less progress in complying with them than they should; this is shown by the reports received to date by the Commission on Car Service. In general, the excess of open top equipment is located on western lines and the excess of box cars on eastern lines. It is apparent that both classes of lines have been reluctant to return the kind of equipment of which they have an excess unless their deficiencies in other equipment are at the same time relieved It is equally apparent that if both classes of roads will give their full co-operation in complying with the request of the Commission on Car Service all lines will be mutually benefited.

"The commission is strongly of the view that if any road does not fully and promptly support the program outlined with respect to both open top and box cars such road places itself unfairly in a position of advantage as compared with other railways in the same territory complying with the instructions of the Commission on Car Service. For this reason the Commission on Car Service now makes such deductions as are possible from the reports received, and draws attention to the lines which apparently are not doing everything possible to return excess equipment to deficiency lines, in the hope that these lines will at once show a marked improvement in their performance.

Open Top Equipment

"The only statistics available to the Commission on Car Service from which may be deduced the effect of the request to return open top cars to owners are the 'Percentage of gondola, coal and coke cars on line to total owned,' as reported by the various roads. In studying these figures it must be remembered that roads receiving and not originating coal shipments have on their lines in normal times an excess over cars owned, while roads originating coal traffic normally hold less than their ownership. Regardless of this condition roads having an excess of coal car equipment should have materially reduced such excess following the request of November 23 made by the Commission on Car Service. Comparing the reports of December 8 with those of December 1, November 23 and November 15, the following lines, having an excess above ownership, have not shown the desired improvement in percentage of coal cars on line to total owned:

Road	Nov. 15	Nov. 23	Dec. 1	Dec. 8
Group 1.				
Boston & Albany	151.82	143.40	132.84	159.89
Central Vermont	208.74	199.02	188.34	222.82
New York, New Haven & Hartford.	140.87	148.81	156.96	151.51
Rutland Railroad	84.39	93.87	86.80	104.83
Group 2.				
Erie	117.03	115.35	120.16	119.02
New York Central	110.76	118.40	110.18	111.15
Philadelphia & Reading	113.78	118.93	114.26	116.15
Group 3.				
Ann Arbor	144.59	125.93	142.52	132.15
Chicago, Indianapolis & Louisville.	93.15	104.63	....	110.58
Cincinnati, Hamilton & Dayton	186.11	187.97	167.65	181.18
Cleveland, Cincinnati, Chicago & St. Louis	100.60	100.20	113.27	112.96
New York, Chicago & St. Louis	110.89	106.40	108.01	113.14
Pere Marquette	213.44	189.51	186.11	198.61
Wheeling & Lake Erie	131.81	....	122.65	125.57
Group 4.				
Atlantic Coast Line	237.32	226.46	219.21	228.66
Seaboard Air Line	109.89	112.43	118.15	114.24
Group 5.				
New Orleans & Northeastern	85.77	108.24	138.47	141.12
Group 6.				
Chicago Great Western	146.89	....	144.01	178.48
Great Northern	179.47	174.45	172.42	173.46
Group 7.				
Union Pacific (Inc. O. S. L. and O.-W.)	131.23	132.43	136.59	129.62
Group 8.				
Missouri Pacific	108.46	104.75	104.01	112.82
St. Louis Southwestern	153.07	145.03	143.22	145.16
Group 9.				
Fort Worth & Denver City	264.53	248.77	228.08	252.71
Texas & Pacific	196.33	204.91	196.11	194.79
Group 10.				
Southern Pacific (Inc. Sunset-Central)	....	....	212.43	211.70
Western Pacific	577.33	582.67	637.33	652.00
Group 11.				
Canadian Govt. Rys. (Intercolonial).	182.96	205.40	204.74	225.85
Grand Trunk	170.28	166.77	166.68	161.23

Box Cars

"The location statistics of box cars available to the Commission on Car Service are supplemented by reports of box cars interchanged with Northern and Eastern and with Southern and Western connections. These interchange reports of box cars for the first eight days in December are overdue in the case of all railways excepting the following, and attention is especially drawn to the negligence in this respect of all other lines. In listing the roads sending these reports the percentage of box cars on line to total owned, according to their last report, is given for each line, as well as the percentage of box cars delivered to southern and western connections in excess of those received:

Road.	Per Cent of Box Cars on Line to Total Owned Dec. 8.	Excess of Deliverise, Per Cent
Group 1.		
Boston & Albany	114.94	— 5.58*
Boston & Maine	158.51	37.21
Central Vermont	99.48	3.06
Maine Central	121.58	6.70
New York, New Haven & Hartford	98.53	24.99
Rutland	72.87	24.67
Group 2.		
Central Railroad of New Jersey	116.99	11.55
Lehigh Valley	125.18	— 14.35*
New York Central	133.91	4.07
Central New England	75.35	17.18
Delaware, Lackawanna & Western	105.83	20.48
Pennsylvania (Inc. Penna. Co.)	141.02	16.66
Philadelphia & Reading	187.39	1.10
Western Maryland	405.48	97.36
Union R. R.	.....	18.32
Group 3.		
Michigan Central	115.59	4.25
Wabash	140.49	2.74
Toledo & Ohio Central	162.23	— 5.80*
Lake Erie & Western	72.36	— 13.14*
Pittsburgh & Lake Erie	87.54	19.19
Vandalia	141.14	10.48
Group 4.		
Carolina, Clinchfield & Ohio Ry	72.79	63.68
Coal & Coke	91.50	.....
Southern	92.29	13.07
Group 5.		
Atlanta & West Point	92.76	20.17
Central of Georgia	80.66	6.30
Illinois Central	65.18	4.11
Nashville, Chattanooga & St. Louis	53.74	7.13
Group 6.		
Chicago & Alton	83.53	— 2.71*
Chicago & Eastern Illinois	83.51	— 11.89*
Chicago, Burlington & Quincy	77.46	3.40
Chicago, St. Paul, Minneapolis & Omaha.	93.16	2.20
Northern Pacific	95.92	13.56
Toledo, Peoria & Western	84.92	30.28
Group 7.		
Union Pacific (Inc. O. S. L.—O. W. R. R. & N.)	70.79	7.44
Group 8.		
Colorado & Southern	50.85	1.26

* Receipts were in excess of deliveries.

"It is clearly apparent from the above that the following railways having an excess of box car equipment have not complied with the request of the Commission on Car Service to deliver a designated excess of box cars to southern and westerns connections above the number of box cars received from such connections:

"Boston & Albany,
"Maine Central,
"Lehigh Valley,
"Philadelphia & Reading,
"New York Central,
"Michigan Central,
"Wabash,
"Toledo & Ohio Central.

"The following additional railways, which are delinquent in sending in their reports of box cars interchanged with connections, are not satisfactorily reducing the excess of box car equipment on line as compared with number owned, according to reports made to the Commission on Car Service:

Road.	Nov. 15	Nov. 23	Dec. 1	Dec. 8
Group 2.				
Baltimore & Ohio	123.54	123.72	124.69	129.33
Erie	117.77	116.58	121.65	122.47
Long Island	690.97	633.15	644.75	695.40
New York, Ontario & Western	214.86	210.71	215.85	202.19
New York, Philadelphia & Norfolk.	119.05	131.28	141.08	140.07
Group 3.				
Ann Arbor	97.07	91.29	111.40	117.65
Grand Rapids & Ind.	128.80	125.73	139.75	135.78
New York, Chicago & St. Louis	117.78	121.98	135.96	126.70
Pere Marquette	121.72	119.31	119.86	117.38
Wheeling & Lake Erie	288.79	....	305.44	291.34
Group 4.				
Chesapeake & Ohio	146.91	141.92	144.69	181.38
Norfolk Southern	93.66	97.57	109.64	111.93
Seaboard Air Line	107.93	99.33	103.66	108.06
Group 5.				
Florida East Coast	136.22	140.99	142.04	161.96
Group 6.				
Duluth, South Shore & Atlantic	138.24	121.46	131.65	124.70
Group 8.				
Kansas City Southern	116.49	94.89	112.04	113.40
Group 9.				
International & Great Northern	223.43	218.66	234.15	204.76
Group 11.				
Can. Govt. Rys. (Intercolonial)	101.49	108.69	113.23	117.33

Location Reports

"Reports overdue from the following railroads have failed to reach the commission:

"Delaware & Hudson, report of box cars for December

8, and all reports for all dates as to open cars.
"Louisville & Nashville, all reports for December 8.
"Chicago, Milwaukee & St. Paul, all reports for December 8, and also reports for all dates as to the separation of box and open cars.
"Chicago and North Western, all reports for December 8.
"M. K. & T., all reports for December 8.
"El Paso & Southwestern, all reports for all dates as to the separation of box and open cars.
"Chicago Belt, all reports for all dates.
"Chicago, Rock Island & Gulf, all reports for all dates.
"Midland Valley, all reports for all dates.
"Spokane, Portland & Seattle, all reports for December 8.
"Canadian Northern, all reports for all dates.
"Grand Trunk Pacific, all reports for all dates."

Penalties to Be Imposed for Car Diversion

At a meeting of the commission on December 21 the commission authorized an issuance of a circular calling attention to the per diem rules and stating that under the authority given the commission by these rules it had suspended the diversion penalty, so far as box cars are concerned, until March 1. The penalty had previously been suspended until January 1 so that on January 1 the diversion penalty will become effective on all cars except box, furniture and automobile cars. The circular quotes per diem rules 19 and 3, empowering the commission to institute proceedings against members for violation of rules and to impose penalties of $5 and $10 per car for diversion. The circular stated that the commission proposed to exercise its authority under these rules and asked for the earnest co-operation of all railways. The extension of the date as to box cars will permit the continuance of the plan for equalizing box cars between roads having an excess and those having a deficiency.

A telegram was received from President Smith of the New York Central stating that this road had on its line thousands of cars for western and southern roads which were being delayed because those roads would not accept them. Telegrams were sent at once to the presidents of those roads.

I. C. C. Proposes Drastic Order

Following the issuance of its circular, the Interstate Commerce Commission on December 22 issued an order, notifying the railroads to appear at a hearing at Washington on December 28 and show cause why an order should not be issued requiring roads to return to their owners, without diversion or misuse, all foreign open top cars and all railroad-owned or controlled refrigerator, heater, ventilated and insulated cars, after being unloaded at destination, and all other foreign freight cars in accordance with Car Service Rules 1, 2, 3 and 4, "or to effect a relocation of such cars in accordance with such other rules as may be found reasonable and be prescribed."

The conference between the Commission on Car Service, traffic officers of the railways and representatives of the shippers, held at Washington on December 20 and 21 to discuss rules proposed by the railways to prevent abuses of the reconsigning privilege, failed to reach any agreement. The shippers objected strenuously to a set of rules proposed by the roads and to a modification of the original proposal submitted on December 21. It was decided that the roads should submit another proposal to the Interstate Commerce Commission, to be drafted at a meeting in Chicago on December 28 and to be submitted by the commission to the shippers, in the hope of reaching a compromise.

German Women to Fire Locomotives.—According to press despatches, the Saxon State railways are now proposing to employ women in the place of signalmen, pointsmen and locomotive stokers, as well as in the loading and unloading of goods trains.

POWDERED COAL FOR STATIONARY BOILER PLANTS*

By C. W. Corning
Chief Smoke Inspector, Chicago & North Western

An experimental installation for burning powdered fuel in stationary boilers was made on a 463-horsepower Sterling type boiler at the Olyphant, Pa., power plant of the Hudson Coal Company. The installation was made to determine whether or not the smaller sizes of anthracite coal, such as Birdseye and slush, could be used in a pulverized form, thus providing a use for relatively low grade and waste fuel, and at the same time providing an automatically fired boiler with the opportunity, thereby, to increase the boiler capacity. During a continuous run of one week, ending August 16, 1916, an average of 603 horsepower, or 130 per cent of the rating, was obtained with an average boiler pressure of 141 lb. The average water evaporation per pound of coal from and at 212 deg. was 8.7 lb., and the average CO_2 in the flue gases was 10.1 per cent. This performance was obtained with pulverized anthracite Birdseye, which averages from 0.5 per cent to one per cent in moisture; 7 per cent in volatile; 76 per cent in fixed carbon; 16 per cent in ash; 1 per cent in sulphur, and about 12,000 B.t.u. The ash, frequently goes as high as 22 per cent, with a corresponding reduction in the fixed carbon and the heat value.

The following figures, taken from a daily report covering a 24-hour run at this same plant, show what can be accomplished by the use of anthracite slush. This fuel runs from 30 per cent to 45 per cent in ash, and from 7 per cent to 8 per cent in volatile matter:

Boiler rating	108 per cent
Evaporation from and at 212 deg. F.	7.4 lb.
CO_2 in flue gases:	
Maximum	17 per cent
Minimum	15.8 per cent
Average	16.5 per cent
Pressure of air at the feeder fan discharge.	7 in. (water)
Vacuum at the burner .....0.25 in. to	0.5 in. (water)
Vacuum in combustion chamber.	0.16 in. (water)
Vacuum in breeching uptake.	0.27 in. (water)
Temperature of flue gases:	
Maximum	610 deg. F.
Minimum	430 deg. F.
Average	475 deg. F.

On a 48-hour continuous test of the boiler at about 170 per cent of its rating, the evaporation with pulverized anthracite Birdseye averaged as high as 9.3 lb. of water per pound of coal from and at 212 deg. F., and the analysis of the flue gases averaged 16.6 per cent in CO_2. From a comparison of the results of pulverized fuel burning boiler with the hand-fired boiler of the same type in using Birdseye fuel, it has been found that using the fuel in the pulverized form about 8½ lb. of water can be evaporated per pound of coal, whereas when fired on grates about 6 lb. of water will be evaporated per pound of coal, showing an increase of about 40 per cent in efficiency for the pulverized fuel.

In none of the tests or operations has there been any more accumulation of soot or ash than obtains with hand-firing, and the amount of slag collected in the slag-pans averages from 4 cu. ft. to 5 cu. ft. for each 24 hr. The operation of the boiler with pulverized fuel gives no trouble when the coal feeder and dampers, after being set for a certain rating of the boiler, say 135 per cent, remain unchanged day in and day out.

Canal Companies Demand War Bonus.—After the Irish railway companies come the canal companies to ask the government to pay the war bonus to their men. The rates of canal companies are governed by the competitive railroad rates and cannot, therefore, readily be raised. The companies complain that much of the heavy traffic hitherto sent by rail now goes by canal, and that therefore they have a claim on the government.—*The Engineer, London.*

*Taken from a paper presented at the St. Louis convention of the Smoke Prevention Association.

Cars and Locomotives Ordered in 1916

High Prices and Poor Deliveries Characterize Year. Domestic and Foreign Purchases Total $550,000,000

IN the 12 months of 1916 the railways, private car lines and other users of cars and locomotives in the United States and Canada placed orders for 2,891 locomotives, 165,324 freight cars and 2,540 passenger cars. In the same period orders were received from foreign countries by builders in the United States and Canada for 2,983 locomotives and 34,214 freight cars, making totals respectively of no less than 4,974 locomotives and 199,538 cars. In view of the exceptionally high prices at which all this equipment has been sold this means that 1916 has been undoubtedly the busiest year in the history of the car and locomotive business. Consider domestic orders alone: about 2,900 locomotives at $30,000 each, which, if anything, is rather low, $87,000,000; about 165,000 freight cars at $1,500 each, $247,500,000, and 2,500 passenger cars at $18,000 each, $45,000,000, making a very conservative figure of $379,500,000. It is not so easy to estimate the total for foreign orders but the value is at least $170,500,000, making a total for both foreign and domestic car and locomotive business of $550,000,000 or well over $10,000,000 a week.

TABLE I—THE ORDERS IN 1916

	Locomotives	Freight Cars	Passenger Cars
Domestic	2,891	165,324	2,540
Foreign	2,983	34,214	109
Total	4,974	199,538	2,649

TABLE II. DOMESTIC ORDERS SINCE 1901.

Year.	Locomotives.	Freight Cars.	Passenger Cars.	Year.	Locomotives.	Freight Cars.	Passenger Cars.
1901	4,340	193,439	2,879	1909	3,350	189,360	4,514
1902	4,665	195,248	3,459	1910	3,787	141,024	3,881
1903	3,283	108,936	2,310	1911	2,850	133,117	2,623
1904	2,538	136,561	2,213	1912	4,515	234,758	3,642
1905	6,265	341,315	3,289	1913	3,467	146,732	3,179
1906	5,642	310,315	3,402	1914	1,265	80,264	2,002
1907	3,482	151,711	1,791	1915	1,612	109,792	3,101
1908	1,182	62,669	1,319	1916	2,891	165,324	2,540

The outstanding feature in this year's buying has been the prices paid. Freight and passenger cars have actually advanced from 75 to 80 per cent over what they were a year ago; they are now almost three times what they were two years ago at this time. As it happened, however, over one-half the freight car contracts were closed since October 1 or when prices were at their highest. This paper has commented on this in its editorial columns and has noted that this improper way of doing business resulted because the railways were unable to foresee how prosperous this country would become. For months and months they withheld buying only to be compelled finally to make their purchases when it appeared that the rise in prices was never going to stop.

The increase in locomotive prices has been spectacular enough but the rise has not been quite so great as in the case of freight cars. Locomotive buying has been somewhat steadier except for a few of the summer months with the exceptions that there has been a tremendous amount of foreign buying since October 1. The output of the locomotive plants is now pretty well contracted for until 1918. The Baldwin Locomotive Works has an order from the Frisco for 30 Santa Fe locomotives to be delivered in June, July and August, 1917. A New York Central order for 230 locomotives given to the American Locomotive Company and Lima Locomotive Works, as reported in the *Railway Age Gazette* of September 22, will be delivered about November, 1917; the American Locomotive Company has an order for 50 locomotives from the Paris-Orleans Railway of France also down for delivery next November, and one for 100 locomotives from the French State Railways designated to be filled in January and February, 1918.

These facts are of special interest, incidentally, for they mean that the car and locomotive plants and equipment specialty manufacturers are fast getting on a peace basis.

TABLE III.—CLASSIFICATION OF LOCOMOTIVES ORDERED 1911-1916.

	1916	1915	1914	1913	1912	1911
Mikado	754	562	333	796	1,309	590
Switching	730	221	201	638	821	443
Consolidation	63	194	166	823	858	577
Mallet	218	120	59	72	168	112
Pacific	278	102	174	566	594	486
Santa Fe	325	75	63	...	...	...
Ten-wheel	40	39	48	255	364	238
Mogul	28	12	24	42	61	127
Mountain or Mohawk	182	9	12	24	...	2
Atlantic	2	1	34	46	5	9
American	1	1	19	8	8	27
Electric	32	69	59	94	75	133
Other	238	168	73	103	252	406
Total	2,891	1,573	1,265	3,467	4,515	2,850

TABLE IV. OUTPUT, 1899-1916.

Year	Locomotives	Freight Cars	Passenger Cars
1899	2,475	119,886	1,305
1900	3,153	115,631	1,636
1901	3,384	136,950	2,055
1902	4,070	162,599	1,948
1903	5,152	153,195	2,007
1904	3,441	60,806	2,144
1905*	5,491	165,155	2,551
1906*	6,952	240,503	3,167
1907*	7,362	284,188	5,457
1908*	2,342	76,555	1,716
1909*	2,887	93,570	2,849
1910*	4,755	180,945	4,412
1911*	3,530	72,161	4,246
1912†	4,915	152,429	3,060
1913†	5,332	207,684	3,296
1914†	2,235	104,541	3,691
1915†	2,085	74,112	1,949
1916†	4,075	135,001	1,839

* Includes Canadian output.
† Includes Canadian output and equipment built in railroad shops.

TABLE A.—CLASSIFICATION OF FREIGHT CARS ORDERED DURING 1916.

	All Steel a	All Steel frame and steel underframe c	Steel underframe b	Composite underframe d	Wood f	Not specified	Total	Draft Gear: Spring m	Draft Gear: Friction n	Draft Gear: Not specified
Box	1,560	12,261	24,256	12,650	6,416	5,450	62,593	18,985	25,819	17,789
Refrigerator	....	.....	3,191	100	1,168	2,515	6,974	2,662	1,297	3,015
Hopper, including ore	30,940	.....	750	...	760	3,926	36,376	6,073	20,977	9,326
Gondola	7,829	4,007	5,648	3,500	3	9,063	30,050	10,350	10,125	9,575
Coal (not otherwise specified)	560	.....	.....	...	75	1,000	1,635	...	575	1,060
Stock	....	800	3,260	500	825	1,360	6,745	1,615	2,950	2,180
Flat	2,313	.....	.....	73	651	155	3,192	218	1,358	1,616
Tank	13,637	.....	.....	...	...	6	13,643	12	13,320	311
Caboose	7	145	218	206	15	51	642	290	83	269
Miscellaneous or not specified	361	900	169	9	312	1,723	3,474	602	846	2,026
Total	57,207	18,113	37,492	17,038	10,225	25,249	165,324	40,807	77,350	47,167

It is well known and a matter of record that many, if not most, of these plants have been working on large ammunition contracts. While many of them have undoubtedly realized large profits on this business, it is a source of gratification that the prosperity of these companies will henceforth be on a more stable basis.

It will further be a reason for pride that the car and locomotive plants now busy on the manufacture of railway equipment for England, France and Russia will be among the first to help those countries in the work of reconstruction after the war.

How the Information Is Compiled

The tables on the following pages are detailed lists of the locomotives, freight cars and passenger cars ordered by the railways, private car lines and industrial companies in the United States and Canada and also of the orders for equipment for export. A great effort has been made to make these lists as complete as possible. It will be found, however, that the orders do not add up to as great amounts as the totals given in Tables I, II, III, and A. In addition to the orders concerning which data is given, orders were also placed (as reported by the equipment builders) for 118 locomotives and 151 tank, 22 logging, 4 dump, 15 hopper, 15 flat, 150 coal, 200 stock and 193 other cars on domestic orders, and 2 tank, 20 dump, 2 stock, 209 cane, 145 box, 35 flat, 586 gondola and 4,073 other freight cars and 44 passenger cars on foreign orders concerning which it was impossible to obtain detailed information. Although, even with this, there may be some omissions of both domestic and foreign orders, it is likely that these omissions are very few and, under any condition, the results are sufficiently accurate to meet the general purpose for which these statistics are prepared, namely, to show the character and extent of the purchases of motive power and rolling stock this year as compared with preceding years.

The information given herewith is compiled from official sources. The *Railway Age Gazette* in answer to its inquiries has received communications from practically all of the railroads and private car lines in the United States and Canada. In the case of foreign orders and where no replies were received from railways in this country, the details were taken from the weekly records or from the reports of builders. The readers of the *Railway Age Gazette* might be very much surprised if they could understand how great is the degree of co-operation that is given in compiling these figures by the railroads and builders of cars and locomotives.

Locomotives Ordered

The striking feature about the orders for locomotives this year is that the foreign orders are about equal to domestic orders, this resulting because very large purchases were made in this country by England, France and Russia. As far as the domestic orders are concerned, it is to be noticed as shown in Table III, that there has been a very strong tendency toward the purchase of Santa Fe and Mountain or Mohawk type locomotives. The purchases of Santa Fe locomotives total 325, as compared with 75 in 1915 and 63 in 1914. The Mountain or Mohawk type locomotives ordered total 182, as compared with orders for 47 locomotives of this kind in the five years from 1911 to 1915. The New York Central and the Southern both ordered a large number of these locomotives, the New York Central's total being no less than 139. The switching and Mallet type locomotives also show fairly large increases over former years, but the Consolidation and electric show very considerable decreases. Of the total of 2,891 locomotives ordered 2,355 are specified as being equipped with superheaters and 2,233 with brick arches. Special valve gears have been specified for 738 locomotives, including 616 Baker and 122 Southern. In addition to that 718 locomotives will be equipped with stokers; 564 Street, 71 Duplex, 45 Hanna, 25 Crawford and 13 Standard.

Freight Cars Ordered

The total of freight cars ordered shows, as may be seen from Table II, a very considerable increase over 1915 and is over twice as large as the total for 1914. In fact the total is the best with the exception of 1912 since 1906. As far as prices are concerned, however, it has been one of the best years in the history of the business. The outstanding feature in this year's totals, as shown in Table A, is the reversion to all-wood or composite underframe cars. Only 1,560 all-steel box cars are reported as against a total of 11,005 in 1915. This, of course, is partly due to the absence of large Pennsylvania orders for all-steel box cars, but even taking that into consideration it shows very strikingly with the increase of composite underframe box cars from 1,225 to 12,560, and in all-wood cars from 601 to 6,416 from 1915 to 1916, the effect of the exceedingly high prices and poor deliveries of steel.

Passenger Cars Ordered

There has been no such reversion to wooden cars as has been noted in the case of freight cars. This is the best possible evidence that the all-steel passenger car has come to stay, and this for the reason that the prices of passenger cars have advanced in even greater proportion than has been the case with freight cars. Practically the only wooden cars ordered were some ordered for Canadian roads. Practically all the cars have been specified as being equipped with electric lighting. The *Railway Age Gazette* this year has made an effort to ascertain what kind of batteries have been used with the axle generator equipment. The results have not been as satisfactory as might be wished, but of 716 cars concerning which data is given as to storage batteries for lighting equipment 370 have been specified as using lead acid and 346 as using nickel alkaline batteries.

Equipment Built

During 1916 there have been built in the car and locomotive plants and railroad shops 4,075 locomotives, 135,001 freight cars and 1,839 passenger cars, a considerable increase over last year's low figures of 2,085 locomotives, 74,112 freight cars and 1,949 passenger cars. This year's totals, however better they may be than 1915's figures, do not begin to express the roal prosperity of the business for the reasons (1) that so large a proportion of the orders were placed in the last three months of the year, (2) because they do not indicate the high prices and (3) because, as previously noted, they cannot show the munitions orders. Of the 4,075 locomotives built, 2,708 were for domestic and 1,367 for foreign companies. Of the 135,001 freight cars, 113,692 were for domestic and 21,309 for export business, and of the total 56,053 are specified as being of all-steel construction, 59,636 as having steel underframes, 8,849 as being of wood and the remainder are not specified. Of the 1,839 passenger cars, 1,769 were for domestic use and 70 for export. Of the total, 1,600 are specified as being of all-steel construction, 200 as having steel underframes and 39 as being of wood.

It will be noted that foreign orders play an important part in the builders' activities. Some companies, particularly those in Canada, almost specialized on foreign orders. As was the case last year, also, a number of American companies confined themselves almost entirely to repair work.

FREIGHT CARS ORDERED IN 1916

Purchaser	No.	Kind	Capacity	Builder
Aetna Explosives Co.	an 50	Tank	100,000	Gen'l Am.
Ajax Gasoline Co.	an 10	Tank		Am. C. & F.
Alabama & Vicksburg	bn 113	Box	60,000	Am. C. & F.
	bn 12	Gondola	80,000	Am. C. & F.
Alabama Great Southern	dm 695	Box	60,000	Am. C. & F.
	dm 100	Auto	60,000	Am. C. & F.
Algoma Cent. & Hudson Bay	f 2	Caboose		Co. shops
Algoma Eastern	am 125	Otis Ore	100,000	Can. C. & F.
Am. Refrig. Tran. Co.	bm 30	Refrig.	60,000	Am. C. & F.
American Rolling Mill Co.	an 20	Gondola	100,000	Press. Steel
American Steel & Wire Co.	an 30	Tank	50,000	Gen'l Am.
	an 55	Tank	100,000	Gen'l Am.

Items marked with an asterisk in these tables are not included in the totals.

Purchaser	No.	Kind	Capacity	Builder
Anaconda Copper Mining Co..	an 7	Tank	100,000	Gen'l Am.
	an 3	Tank	60,000	Gen'l Am.
	20	Flat	60,000	Press. Steel
	a 10	Gondola	600,000	Press. Steel
Ashland Coal & Iron	a 10	Flat	100,000	Gen'l Am.
Atchison, Topeka & Santa Fe.	bn 1000	Stock	80,000	Has. & Bar.
	an 500	Tank	80,000	Press. Steel
Atlanta & West Point	fm 53	Box	60.000	Co. shops
	fm 11	Auto	60,000	Co. shops
	fn 10	Box	60,000	Co. shops
	fm 13	Flat	60,000	Co. shops
	fm 10	Flat	80,000	Co. shops
Atlantic Coast Line	bn 500	Box	60,000	Bar. & Smith
	an 300	Flat	80,000	Bar. & Smith
	bn 25	Rodg. Bal.	100,000	Am. C. & F.
	bn 1200	Box	60,000	Bar. & Smith
	an 500	Flat	80,000	Bar. & Smith
	cn 100	Stock	80,000	Std. Steel
	a 200	Flat	60,000	Co. shops
Baltimore & Ohio	an 1000	Hopper	110,000	Am. C. & F.
	an 2000	Hopper	110,000	Cambria Stl.
	dn 1000	Box	80,000	Has. & Bark.
	dn 2000	Box	80,000	Mt. Vernon
	bn 480	Box	80,000	Am. C. & F.
	dn 350	Box	80,000	Ryan
	b 20	Box		Co. shops
	b 500	Refrig.		Co. shops
Barrett Company	an 10	Tank	10,000	Am. C. & F.
Berlin Mills Co	1	General Sec.		Press. Steel
Bessemer & Lake Erie	cn 500	Gondola	100,000	Ralston
	an 500	Hopper	100,000	Am. C. & F.
	an 750	Hopper	100,000	Press. Steel
	an 750	Hopper	100,000	Std. Steel
Bethlehem Steel Corp	100	Gondola		Press. Steel
	50	Hopper		Press. Steel
	30	Coke		Press. Steel
Bingham & Garfield	an 150	Ore	120,000	Press. Steel
	an 25	Con'trate	120,000	Press. Steel
	an 25	Con'trate	120,000	Std. Steel
	an 3	Tank	100,000	Am. C. & F.
	f 7	Flat		Co. shops
	f 2	Caboose		Co. shops
	f 1	Box		Co. shops
Birmingham Southern	20	Flat	140,000	Press. Steel
Boston Elevated	am 2	Flat	45,000	J. G. Brill
	an 2	Work	45,000	J. G. Brill
Boyne City, Gaylord & Alpena	f 35			Co. shops
Brier Hill Steel Co	20	Coke		Press. Steel
Brooklyn A. R. Co	fm 15	Cinder	80,000	Mt. Vernon
Bureau of Mines	a 3	Rescue		Am. C. & F.
Butler Co. Oil Ref. Co	an 10	Tank	8,250	Pa. Tank
Butte, Anaconda & Pacific	an 300	Hopper	100,000	Press. Steel
	b 2			Co. shops
	f 3			Co. shops
Butterworth, Judson	an 10	Tank	100,000	Pa. Tank
Cambria & Indiana	am 1000	Hopper	100,000	Cambria
Can. Gov't Rys. (Intercol. Div.)	am 10	Snow Plows		Can. C. & F.
Can. Gov't Ry. (Transcon. Div.)	cm 500	Box	100,000	Can. C. & F.
	am 10	Snow Plow		Can. C. & F.
	fm 200	Box	60,000	Can. C. & F.
	fm 100	Refrig.	60,000	Can. C. & F.
	cm 500	Box	100,000	Eastern
Calumet & Arizona Min. Co..	an 26	Tank		Gen'l Am.
California Dispatch Line	an 5	Tank	80,000	Gen'l Am.
Cabin Creek Ref. Co	an 50	Tank	60,000	Am. C. & F.
	an 150	Tank	80,000	Am. C. & F.
Canadian Northern	50	Caboose		Co. shops
	6	Tank		Kennicott
	3	Snow Plow		Co. shops
Canadian Pacific	bm 811	Refrig.	60,000	Co. shops
	bgm 1170	Box	80,000	Co. shops
	bn 184	Furn.&auto.	80,000	Co. shops
	am 20	Otis Ore	100,000	Can. C. & F.
Cananea Cons. Copper Co	a 10	N. g. dump	60,000	Am. C. & F.
Canton R. R	an 1	Air Dump	100,000	West. Wh.
Carnegie Steel Co	160	Gondola		Press. Steel
	42	Hopper		Press. Steel
	an 10	Tank	10,670	Pa. Tank
	an 159	Hopper	140,000	Ralston
Carolina, Clinchfield & Ohio	an 500	Hopper	100,000	Press. Steel
	bn 5	Caboose		Am. C. & F.
Central of Georgia	bn 50	Stock	80,000	Co. shops
	bn 50	Box	80,000	Co. shops
Central of New Jersey	a 2			Co. shops
	d 9			Co. shops
	f 5			Co. shops
Central Vermont	bm 2	Box	60,000	Co. shops
	fm 1	Flat	60,000	Co. shops
	fm 3	Snow Plows		Co. shops
	fm 1	Caboose		Co. shops
Cherry River Boom & Lbr. Co.	a 24	Logging	60,000	Am. C. & F.
	a 24	Logging	60,000	Am. C. & F.
	a 24	Logging	60,000	Am. C. & F.
	a 48	Logging	60,000	Am. C. & F.
Chesapeake & Ohio	an 2000	Hopper	140,000	Press. Steel
	an 1000	Hopper	100,000	Std. Steel
	an 500	Hopper	100,000	Press. Steel
	an 500	Hopper	100,000	Ralston
	dm 1000	Box bod	60,000	Central Loco.
	b 46	Caboose		Co. shops
Chicago & Alton	dm 500	Gondola	80,000	Has. & Bar.
	dn 200	Auto.	80,000	Has. & Bar.
Chicago & No. West	cn 500	Stock	60,000	West. Steel
	cn 1000	Auto.	80,000	West. Steel
	fn 1000	Box	60,000	Am. C. & F.
	dn 1000	Box	60,000	Am. C. & F.
	an 500	Ore	100,000	Pullman
	cn 1000	Gondola	100,000	Pullman
	500	Underframes		Am. C. & F.
Chicago, Burlington & Quincy.	*500	Auto.	80,000	Am. C. & F.
	am 1500	Gen'l Ser.	100,000	West. Steel
	cm 2000	Box	80,000	Has. & Bark.
	am 100	Dump	20 yd.	West Whld.
	dm 100	Stock	60,000	Co. shops

Purchaser	No.	Kind	Capacity	Builder
Chic., Bur. & Quincy (con.)	dm 200	Stock	60,000	Co. shops
	bm 25	Way	30 ft.	Co. shops
	am 1	Scale Test		Am. C. & F.
Chicago Great Western	an 2	Dump	20 yds.	West. Whld.
Chicago Junction	b 1	Box		Co. shops
	a 3	Flat		Co. shops
Chic., Lake Shore & So. Bend.	c 7	Gondola	100,000	West. Steel
	2	Flat	100,000	West. Steel
	c 9	Box	80,000	West. Steel
Chicago, Milwaukee & St. Paul	bn 1066	Box	80,000	Co. shops
	bn 250	Auto.	80,000	Co. shops
	fm 750	Ore	110,000	Co. shops
	fn 225	Logging	80,000	Co. shops
	dn 1000	Gondola	100,000	Co. shops
	an 120	Flat	100,000	Bettendorf
Chicago, St. P., M. & Omaha	dn 500	Box	60,000	Am. C. & F.
	c 200	Stock	60,000	Bar. & Smith
Cin., New Orleans & Tex. Pac.	dm 1409	Box	60,000	Mt. Vernon
	dm 200	Auto.	60,000	Mt. Vernon
	*50	Steel ctr. sills		Mt. Vernon
	*600	Underframes		Mt. Vernon
Clark Car Co	500	Dump		Cambria
Cleveland, Cin., Chic. & St. L.	1000	Coal		Std. Steel
	*33	Underframes		Am. C. & F.
Coal & Coke	2			Co. shops
Colorado Midland	b 1			Co. shops
	f 21			Co. shops
Columbia Chemical Co	3	Dump	80,000	Am. C. & F.
Commercial Car Line	an 25	Tank	100,000	Chic. Steel
	an 50	Tank	100,000	Am. C. & F.
Constantin Refining Co	an 20	Tank	80,000	Am. C. & F.
Continental Refining Co	an 3	Tank	8,250	Pa. Tank Car
Cooper's Creek Chem. Co	an 1	Tank	100,000	Pa. Tank
Corrigan, McKenney & Co	6	Hopper		Press. Steel
Cosden & Co	an 750	Tank	10,000	Am. C. & F.
	an 100	Tank	8,000	Am. C. & F.
	an 25	Tank	6,000	Am. C. & F.
Crescent Tank Line	an 125	Tank	80,000	Gen'l Am.
Crew Levick Co	an 25	Tank	100,000	Pa. Tank
	an 10	Tank	60,000	Pa. Tank
Cudahy Ref. Co	an 500	Tank	8,000	Pa. Tank
	an 150	Tank	60,000	Am. C. & F.
	an 250	Tank	80,000	Am. C. & F.
Cumberland Valley	an 7	Caboose		P. R.R.shops
	an 100	Hopper	140,000	P. R.R.shops
Cushing Refining Co	an 40	Tank	80,000	Am. C. & F.
Danville & Western	dm 100	Box	60,000	Am. C. & F.
Darling & Co	an 5	Tank	8,250	Pa. Tank
Davis Chemical Co	an 10	Tank	100,000	Am. C. & F.
Delaware & Hudson	*1,000	Underframes		Am. C. & F.
	b 20			Co. shops
Del., Lackawanna & Western	bn 500	Box	80,000	Am. C. & F.
	an 500	Hopper	100,000	Press. Steel
	an 55	Hopper	150,000	Press. Steel
Denver & Rio Grande	cn 1500	Box	80,000	Pullman
	cn 500	Ballast	100,000	Rodger Bal.
Denver & Salt Lake	b 1			Co. shops
Detroit, Toledo & Ironton	fn 400	Auto.	80,000	Am. C. & F.
	fn 75	Box	60,000	Co. shops
	fn 37	Refrig.	80,000	Co. shops
	fn 75	Coal	80,000	Co. shops
Detroit United	14	Flat bod		Am. C. & F.
Diamond Alkali Co	10	Gondola		Press. Steel
Diamond Gasoline Corp	an 10	Tank	10,000	Am. C. & F.
Donora Southern	an 30	Gondola	140,000	Ralston
Duluth & Iron Range	a 100	Flat	60,000	Am. C. & F.
Duluth & Northern Minnesota	f 6			Co. shops
Duluth, South Shore & Atlantic	fn 200	Box	80,000	Has. & Bar.
	fn 200	Flat	80,000	Has. & Bar.
	fn 10	Refrig.	60,000	Has. & Bar.
Duluth, Winnipeg & Pacific	f 750	Box	80,000	Has. & Bar.
Du Pont, E. I., & Co	an 5	Tank	10,670	Pa. Tank
	an 5	Tank	10,670	Pa. Tank
	an 4	Tank	10,670	Pa. Tank
	14	Powder		Am. C. & F.
	32	N. G. flat		Am. C. & F.
East Broad Top	a 60	Coal	70,000	Co. shops
East Jersey R. R. & Term	an 22	Tank	80,000	Am. C. & F.
East Tenn. & West. No. C	fm 20	Box	50,000	Co. shops
	fm 10	Hopper	50,000	Co. shops
	fm 30	Flat	50,000	Co. shops
Economy Oil & Ref. Co	an 10	Tank	100,000	Am. C. & F.
Elgin, Joliet & Eastern	f 20	Way		Co. shops
Erie	an 1000	Hopper	100,000	Std. Steel
	cn 1000	Box	80,000	Std. Steel
	cn 1000	Box	80,000	Am. C. & F.
Evans-Thwing Refining Co	an 140	Tank	80,000	Am. C. & F.
	an 60	Tank	100,000	Am. C. & F.
Federal Refrig. Despatch	b 1			Co. shops
Fort Smith & Western	fm 1	Spreader	80,000	Co. shops
Franklin, Ben, Coal Co	4	Hopper		Press. Steel
Freedom Oil Works Co	an 10	Tank	80,000	Am. C. & F.
Fruit Growers Express	bn 500	Fruit	60,000	Co. shops
Gal., Harris. & San Antonio	b 2	Box	100,000	Ralston
	b 100	Stock	80,000	Ralston
	an 1	Tank	100,000	Am. C. & F.
Gal., Houston & Henderson	f 1			Co. shops
Garden City Western	15	Gen'l Ser.		Am. C. & F.
Gasoline Corp.	an 50	Tank		Gen'l Am.
Georgia R. R	f 63			Co. shops
Georgia & Florida	f 1	Stock	60,000	Co. shops
	f 1	Flat	60,000	Co. shops
	f 1	Spreader	60,000	Co. shops
Germania Ref. Co	an 6	Tank	8,250	Pa. Tank
	an 4	Tank	4,500	Pa. Tank
Gillespie, L. C., & Sons	an 16	Tank		Am. C. & F.
Goodman Lumber Co	20	Flat		
Grand Rapids & Indiana	an 200	Box	100,000	P.R.R. shops
Great Northern	fm 500	Refrig.	60,000	Has. & Bar.
	fm 1000	Box	80,000	West. Steel
	fm 500	Auto.	80,000	Has. & Bar.
	fm 500	Refrig.	60,000	Has. & Bar.
	fm 250	Stock	40,000	Co. shops
	fm 250	Stock	60,000	Co. shops

Purchaser	No.	Kind	Capacity	Builder
Great West. Oil Ref.	an 20	Tank	100,000	Am. C. & F.
Gulf & Ship Island	fm 1	Caboose		Co. shops
	fm 3	Flat	60,000	Co. shops
	dm 70	Flat	80,000	Co. shops
	dm 3	Box	80,000	Co. shops
	dm 35	Box	60,000	Co. shops
Gulf Refining Co.	an 100	Tank	8,000	Gen'l Am.
	an 100	Tank	8,000	Pa. Tank Car
Hagenbeck-Wallace	fm 3	Flat	60,000	Mt. Vernon
	fm 1	Stock	60,000	Mt. Vernon
Harrison Bros. & Co.	an 1	Tank	100,000	Pa. Tank
Harrison Bros. & Co.	an 16	Tank	100,000	Am. C. & F.
Hegeler Zinc Co.	an 16	Tank	60,000	Gen'l Am.
Hercules Powder Co.	an 8	Tank	100,000	Am. C. & F.
Hercules Powder Co.	60	Solv. rec.		Am. C. & F.
	40	Solv. rec.		Am. C. & F.
Hocking Valley	b 12	Cabin		Co. shops
Houston & Texas Central	b 150	Stock	80,000	Ralston
	an 2	Tank	100,000	Am. C. & F.
Illinois Central	fm 300	Stock	80,000	Am. C. & F.
	bm 500	Refrig.	80,000	Has. & Bar.
	cm 400	Rodger bal.	100,000	Am. C. & F.
	bm 1000	Gondola	100,000	Pullman
	bm 1000	Gondola	100,000	Has. & Bar.
Illinois Oil Co.	an 10	Tank	5,000	Chicago Steel
	an 8	Tank	6,000	Chicago Steel
Illinois Traction Co.	60	Hopper	100,000	Am. C. & F.
	40	Gondola	80,000	Am. C. & F.
Illinois Traction Co.	f 101	Box	80,000	Am. C. & F.
Independent Ref. Co.	an 15	Tank	80,000	Am. C. & F.
Intermountain	fm 20	Log	80,000	Twohy Bros.
International & Gt. Northern	f 23			Co. shops
International Ref. Co.	an 50	Tank	10,650	Pa. Tank
International Refining Co.	an 25	Tank	10,100	Gen. Am.
	an 30	Tank	8,255	Pa. Tank
Interstate Tank Car Corp.	an 25	Tank	8,000	Am. C. & F.
	an 75	Tank	8,000	Chicago Steel
Island Petroleum Co.	an 15	Tank	80,000	Press. Steel
Kanita Ref. Co.	an 50	Tank	8,000	Pa. Tank
Kansas City Refining Co.	an 10	Tank	100,000	Am. C. & F.
	an 5	Tank	80,000	Am. C. & F.
Keith Car Co.	an 100	Tank	100,000	Am. C. & F.
	an 23	Tank	80,000	Am. C. & F.
Kingan Refrigerator Line	dn 75	Refrig.	60,000	Am. C. & F.
	dn 25	Refrig.		Am. C. & F.
Koppers, H. Co.	an 2	Tank	8,250	Pa. Tank
La Belle Iron Works	an 20	Hopper	100,000	Ralston
Lackawanna Steel Co.	an 700	Hopper	100,000	Std. Steel
	an 700	Hopper	100,000	Am. C. & F.
	an 300	Gondola	100,000	Std. Steel
	an 10	Flat	100,000	Std. Steel
	1	Gravel		Std. Steel
Lake County Gravel Co.	1000	Box		Has. & Bark.
Lake Erie & Western	an 50	Hopper	100,000	Std. Steel
Lake Erie, Franklin & Clarion	an 1	Tank	100,000	Al'gh'y Fdy.
Lake Terminal	bgm 500	Auto.	80,000	Std. Steel
Lehigh Valley	bgn 500	Auto.	80,000	Pullman
	bgm 500	Auto.	80,000	Am. C. & F.
	an 8			Co. shops
	1	Snow Plow.		Russell Car
Liquids Despatch Line	an 30	Tank	10,000	Gen'l Am.
	an 2	Tank	7,120	Gen'l Am.
	an 10	Tank	10,212	Chicago Steel
	an 8	Tank	9,928	O. F. Jordan
Live Poultry Transit Co.	an 100	Poultry	60,000	Has. & Bar.
Live Poultry Transit Co.	b 10			Co. shops
Long Island	15	Refrig.		Std. Steel
Lorain Steel Co.	an 8	Hopper	100,000	Press. Steel
Los Angeles & Salt Lake	an 200	Auto.	100,000	Pullman
	1000	Gen'l ser.	100,000	West. Steel
	500	Gen'l ser.	100,000	West. Steel
Louisiana & Northwest	f 3			Co. shops
Louisiana Oil Refining Co.	an 15	Tank	80,000	Gen'l Am.
	an 10	Tank	80,000	Chicago Steel
Louisiana Western	a 125	Flat	100,000	Ralston
	a 250	Flat bod.	100,000	Ralston
Louisville & Nashville	an 1000	Gondola	100,000	Press. Steel
	an 500	Hopper	100,000	Press. Steel
	dn 1000	Gondola	100,000	Mt. Vernon
	bn 200	Box	80,000	Co. shops
	bn 1000	Vent	80,000	Co. shops
	bn 150	Refrig.	80,000	Co. shops
	bn 300	Auto.	80,000	Co. shops
	bn 100	Furniture	100,000	Co. shops
	bn 100	Stock	80,000	Co. shops
	bn 400	Gondola	100,000	Co. shops
	bn 100	L. S. Gond.	100,000	Co. shops
	bn 750	Gondola	100,000	Co. shops
	dn 1000	Gondola	100,000	Co. shops
	*200	Underframes		Am. C. & F.
	*1,005	Underframes		Mt. Vernon
	*750	Underframes		Mt. Vernon
Lutcher & Moore Lumber Co.	f 100	Logging		Am. C. & F.
McCabe Chemical Co.	am 12	Tank	100,000	Am. C. & F.
McCloud River	f 63			Co. shops
McPherson, John J.	an 10	Tank	100,000	Am. C. & F.
Marcell, L. L.	an 10	Tank	80,000	Am. C. & F.
Marcel Tank Line	an 60	Tank	8,000	Am. C. & F.
	an 40	Tank	10,000	Am. C. & F.
Marion Extract Co.	an 10	Tank	80,000	Am. C. & F.
Mather Horse & Stock Car Co.	dm 100	Stock	60,000	Am. C. & F.
Mather Stock Car Co.	100	Stock		Co. shops
Michigan Ry.	b 10	Box	60,000	Std. Steel
	a 10	Box	50,000	St. Louis
Michigan Central	b 2,000	Box	80,000	Am. C. & F.
Michigan Central	cn 1250	Box	80,000	Bar. & Smith
Michigan Central	*50	Underframes		Am. C. & F.
Midco Gasoline Co.	an 50	Tank	10,670	Pa. Tank
Midvale Chem. Co.	an 2	Tank	100,000	Pa. Tank
Miller Pet. Ref. Co.	an 5	Tank	100,000	Am. C. & F.
	an 10	Tank	80,000	Am. C. & F.
Milwaukee Coke & Gas Co.	a 300	Hopper	140,000	Press. Steel
	a 300	Gen'l Ser.	100,000	Am. C. & F.
Mil. Refrig. Tran.	bm 100	Refrig.	60,000	Co. shops
	fm 21	Refrig.	60,000	Co. shops
Mineral Range	an 100	Rock	100,000	Am. C. & F.

Purchaser	No.	Kind	Capacity	Builder
Minneapolis & St. Louis	1000	Box		Am. C. & F.
	bm 500	Gondola	100,000	Has. & Bar.
M., St. P. & Sault Ste. Marie	an 250	Ore	100,000	Has. & Bar.
	fn 200	Auto.	80,000	Has. & Bar.
	fn 800	Box	80,000	Has. & Bar.
Missouri & No. Arkansas	f 19	Stock		Co. shops
	f 21	Box		Co. shops
Mo., Kansas & Texas	bn 1500	Gondola	100,000	Am. C. & F.
	bn 1000	Stock	80,000	Am. C. & F.
Missouri Pacific	cm 2500	Gen'l Ser.	100,000	Am. C. & F.
Missouri Pacific	*555	Underframes		Mt. Vernon
Mobile & Ohio	dm 1000	Vent.	60,000	Am. C. & F.
Montour R. R.	an 400	Gondola	80,000	Std. Steel
Morris & Co. Tank Line	an 50	Tank	80,000	Chicago Steel
Morris & Co. Refrig. Line	bn 400	Refrig.	60,000	Has. & Bar.
Muskogee Ref. Co.	an 50	Tank	8,000	Pa. Tank
Muskogee Ref. Co.	an 41	Tank	8,000	Pa. Tank
Nashville, Chattanooga & St. L.	1	Dynamometer		Burr Co.
National Refining Co.	60	Tank	8,000	Am. C. & F.
National Ref. Co.	*75	Underframes		Am. C. & F.
National Rosin Oil & Size Co.	an 5	Tank	100,000	Am. C. & F.
New Jersey Zinc Co.	an 6	Tank	100,000	Am. C. & F.
New Jersey Zinc Co.	10	Gen'l Ser.		Press. Steel
New Orleans & No. Eastern	bn 412	Box	60,000	Mt. Vernon
	bn 87	Box	60,000	Am. C. & F.
	bn 69	Gondola	80,000	Am. C. & F.
New York Central	b 1000	Box	80,000	Am. C. & F.
	1000	Gondola		Std. Steel
	b 1000	Box	80,000	Am. C. & F.
	b 1000	Box		Press. Steel
	a 2000	Hopper	100,000	Am. C. & F.
	b 1000	Box	80,000	Am. C. & F.
	2000	Gondola		Std. Steel
	2000	Gondola	140,000	Std. Steel
	750	Stock		M. D. T. Co.
New York Central	cm 750	Box	80,000	Ralston
New York Central	1200	Hopper		Am. C. & F.
N. Y., N. H. & Hartford	an 500	Coal	100,000	Std. Steel
	b 50	Caboose		Co. shops
N. Y., Ontario & Western	cm 20	Caboose		Co. shops
	am 2	Air dump.	80,000	Kil. & Jac.
New York, Ont. & Western	100	Gondola	80,000	Am. C. & F.
N. Y., Phila. & Norfolk	50	Box	100,000	Am. C. & F.
New York Chic. & St. Louis	bm 1000	Box	80,000	Am. C. & F.
	bm 500	Auto.	80,000	West. Steel
	bm 500	Auto.	80,000	West. Steel
	bm 750	Hopper	110,000	Std. Steel
N. Y., Susquehanna & West	an 500	Hopper	80,000	Std. Steel
Norfolk & Western	cn 65	Cabin		Co. shops
Norfolk & Western	1000	Gondola		Co. shops
	1000	Box		Mt. Vernon
No. American Ref. Co.	an 25	Tank	100,000	Am. C. & F.
Norfolk Southern	250			Co. shops
North American Refining Co.	an 50	Tank		Am. C. & F.
No. Car Tanning Extract Co.	an 10	Tank	100,000	Am. C. & F.
Northern Pacific	fm 250	Box	60,000	Co. shops
	fm 715	Box	80,000	Co. shops
	fm 35	Transfer	80,000	Co. shops
	anm 350	Ore	100,000	Press. Steel
	1000	Box		West. Steel
	500	Auto		West. Steel
Northwestern Pacific	am 50	Gondola	100,000	Has. & Bark.
	bm 100	Box	100,000	Ralston
	am 50	Flat	100,000	Ralston
	bm 60	Stock	80,000	Ralston
	fm 3	Caboose		Mt. Vernon
Ogden, Logan & Idaho	25	Box		Co. shops
Ohio Electric	b 10	Box	50,000	Cinti Car
Oliver Iron Mining Co.	25	Dump	140,000	Magor
	a 20	Air dump.	140,000	Magor
	25	Dump	140,000	Or. Art. Kop.
	80	Dump		West. Whld.
Osage Gasoline Co.	an 20	Tank	100,000	Am. C. & F.
Pacific Electric	b 1	Box	100,000	Has. & Bark.
Pan American Ref. Co.	an 50	Tank	8,000	Pa. Tank
Panhandle Ref. Co.	an 13	Tank	80,000	Am. C. & F.
	an 12	Tank	100,000	Am. C. & F.
Parker Amusement Co., C. W.	f 1			Co. shops
Peerless Tank Line	an 15	Tank		Gen'l Am.
	an 60	Tank		Am. C. & F.
Pennsylvania R. R.	a 3000	Hopper		Cambria
	an 2000	Hopper		Ralston
	a 1000	Box		Co. shops
Pennsylvania Lines West	bn 1000	Auto.	100,000	Pa. R. R.
	bn 6	Dump		Std. Steel
	3	Scale Test.	80,000	Pa. R. R.
	b 100	Cabin		Co. shops
Pennsylvania Salt Mfg. Co.	an 4	Tank	100,000	Pa. Tank
Pennsylvania Tank Line	an 2000	Tank	8,250	Pa. Tank
	an 150	Tank	10,650	Pa. Tank
Pensacola Tar & Turpentine	an 1	Tank	8,000	Pa. Tank
Phelps, Dodge & Co.	6	Ore		Press. Steel
Philadelphia & Reading	an 500	Hopper	110,000	Press. Steel
	an 500	Hopper	110,000	Std. Steel
	am 500	Hopper	110,000	Std. Steel
	am 500	Hopper	110,000	Press. Steel
	am 1000	Hopper	110,000	Cambria Stl.
	cm 10	Caboose		Co. shops
Pierce Oil Corp.	an 90	Tank	10,000	Am. C. & F.
	a 26	Tank	6,000	Pa. Tank
	an 125	Tank	100,000	Am. C. & F.
	an 75	Tank	80,000	Am. C. & F.
	an 10	Tank	60,000	Am. C. & F.
Pittsburgh & Shawmut	am 250	Hopper	100,000	Am. C. & F.
	bm 100	Gondola	100,000	Am. C. & F.
	bm 5	Caboose		Rs'll C. S. P.
	am 6	Platform	100,000	Am. C. & F.
Pittsburgh Oil Refining Co.	an 20	Tank	8,000	Pa. Tank
	an 15	Tank	8,000	Am. C. & F.
Pittsburgh Plate Glass Co.	12	Hopper		Press. Steel
Pittsburgh Steel Co.	40	Ore	100,000	Std. Steel
Ponca Refining Co.	an 40	Tank	80,000	Am. C. & F.
	an 1	Tank	8,250	Pa. Tank
Pressed Steel Car Co.	100	Gondola		Co. shops
Producers' Refining Co.	an 50	Tank	80,000	Am. C. & F.
	an 40	Tank	100,000	Am. C. & F.

Purchaser	No.	Kind	Capacity	Builder
Producers Refining Co.	an 40	Tank	80,000	Am. C. & F.
Prudential Oil Corp.	an 15	Tank	60,000	Am. C. & F.
	an 25	Tank	80,000	Am. C. & F.
	an 10	Tank	100,000	Am. C. & F.
Quebec Central	fm 100	Box	60,000	Can. C. & F.
Raritan River	bn 15	Gondola	100,000	Press. Steel
Riverside Oil Co.	an 6	Tank	8,000	Am. C. & F.
	an 10	Tank	8,000	Gen'l Am.
	a 5	Tank	8,000	Co. shops
Robinson Clay Products Co.	2	Ore		West. Steel
Robinson Shows	fm 5	Flat	60,000	Mt. Vernon
	fm 3	Stock	60,000	Mt. Vernon
Roxana Petroleum Co.	an 25	Tank	80,000	Am. C. & F.
	an 25	Tank	100,000	Am. C. & F.
	an 25	Tank	80,000	Am. C. & F.
Rutland	1	Snow Plow		R. C. & S. P.
St. L., B. & Mex.	500	Box		Am. C. & F.
Sapulpa Refining Co.	an 160	Tank	8,000	Gen'l Am.
	an 40	Tank	10,000	Gen'l Am.
Schock Refining Co.	an 75	Tank	8,000	Std. Car Con.
Seaboard Air Line	cm 50	Caboose		Std. Steel
Semet-Solvay Co.	an 75	Tank	10,000	Gen'l Am.
Solvay Process Co.	2	Gen'l Ser.		Bettendorf
	15	Gen'l Ser.		Press. Steel
Southern	dm 1335	Box	60,000	Lenoir
	dm 1223	Box	60,000	Lenoir
	dm 500	Auto.	60,000	Lenoir
	am 1012	Gondola	100,000	Press. Steel
	am 500	Gondola	100,000	Mt. Vernon
	am 1313	Gondola	100,000	Press. Steel
	bm 200	Stock	80,000	Lenoir
	dm 200	Caboose	60,000	Lenoir
Sligo & Eastern	10	Flat		Am. C. & F.
	1	Caboose		Am. C. & F.
Snyder, C. U., & Co.	an 50	Tank	100,000	Am. C. & F.
	an 50	Tank	100,000	Am. C. & F.
Southern Oil Corp.	an 20	Tank	8,100	Gen'l Am.
Southern Pacific	b 500	Box	100,000	Ralston
	a 475	Flat	100,000	Ralston
	a 25	Flat bod.	100,000	Ralston
	b 450	Stock	80,000	Ralston
	b 501	Auto.	100,000	Ralston
	b 999	Box	100,000	Has. & Bark.
	a 200	Gondola	100,000	Has. & Bark.
	a 300	Tank	100,000	Am. C. & F.
Sparks Shows	fm 1	Flat	60,000	Mt. Vernon
	fm 1	Stock	60,000	Mt. Vernon
Standard Car Equip. Co.	an 400	Tank		Pa. Tank
Stoddard Oil Co.	40	Tank	80,000	Am. C. & F.
Street's Company	210	Stock		Co. shops
Sumpter Valley	f 30	Flat		Co. shops
Stoddard Oil Co.	f 5	Box		Co. shops
	an 14	Tank	80,000	Am. C. & F.
Swift & Co.	*110	Underframes		Am. C. & F.
Temiskaming & Northern Ont.	dn 6	Van		Preston
Texas & New Orleans	b 298	Box	100,000	Ralston
	b 100	Auto.	100,000	Ralston
Texas & Pacific	bn 100	Ballast	100,000	Am. C. & F.
	1	Weed burner		Co. shops
Tex., Okla. & Eastern	f 15			Co. shops
Thwing, F. H.	an 20	Tank	80,000	Am. C. & F.
Tucson, Cornelia & Gila Bend.	an 26	Tank	6,000	Gen'l Am.
	cn 2	Box	80,000	M'Guire Cm.
	dn 3	Flat	100,000	M'Guire Cm.
Union Carbide Co.	4	Hopper		Press. Steel
Union R. R.	1250	Hopper	140,000	Press. Steel
	an 750	Hopper	1,000	Ralston
Union Pacific	bn 1500	Box	100,000	Am. C. & F.
	bn 1000	Auto.	100,000	Ralston
	1,800	Refrig.		Am. C. & F.
	700	Refrig.		Co. shops
	200	Box		Seattle C.&F.
	200	Box		Twohy Bros.
	an 100	Tank		Gen'l Am.
Union Tank Line	an 1000	Tank	6,500	Std. Steel
	an 1000	Tank	8,000	Am. C. & F.
	an 500	Tank	6,500	Press. Steel
	an 500	Tank	6,500	Std. Steel
	an 1000	Tank	6,500	Am. C. & F.
	an 250	Tank	6,500	Co. shops
U. S. Aluminum Co.	12	Flat		Std. Steel
U. S. Government	am 2	Flat	100,000	Mt. Vernon
U. S. Navy	fm 2	Flat	60,000	Bar & Smith
	am 3	Hopper	80,000	Mt. Vernon
Utah Copper Co.	150	Ore		Press. Steel
Vandalia	an 150	Box	100,000	Pa. R. R.
	an 150	Gondola	100,000	Has. & Bark.
Vicksburg, Shreve. & Pacific.	bn 100	Box	60,000	Am. C. & F.
Virginia Tank Car Corp.	an 25	Tank	80,000	Am. C. & F.
Virginian	cn 250	Box	80,000	Std. Steel
	an 1	Gondola	240,000	Cambria
	an 1	Gondola	240,000	Press. Steel
	an 1	Gondola	240,000	Std. Steel
	an 1	Gondola	240,000	Va. Bridge
	50	Hopper		Std. Steel
Vizard Gillican	an 15	Tank	8,000	Pa. Tank
Wabash	c 1000	Box bod.		Am. C. & F.
	c 1000	Box		Am. C. & F.
	300	Stock bod.		Am. C. & F.
Wabash Pittsburgh Terminal.	bn 200	Gondola	110,000	Press. Steel
	an 175	Gondola	100,000	Press. Steel
	am 375	Gondola	100,000	Press. Steel
	am 1000	Hopper	100,000	Press. Steel
Wade, Clower & Wade	a 15	Flat	60,000	Mt. Vernon
Warner, Quinlan Asphalt Co.	an 3	Tank	60,000	Am. C. & F.
	an 7	Tank	80,000	Am. C. & F.
	an 20	Tank	100,000	Am. C. & F.
Waycross & Southern	f 1			Co. shops
Western Maryland	an 2000	Hopper	105,000	Pullman
Western Ohio	fm 4	Box	60,000	Bar. & Smith
Western Pacific	bm 800	Box	80,000	Mt. Vernon
	bm 200	Vent.	80,000	Mt. Vernon
	bm 150	Stock	80,000	Mt. Vernon
	f 6	Caboose		Co. shops
	d 100	Stock		Co. shops
Wheeling & Lake Erie	500	Hopper		Press. Steel
	500	Gondola		Std. Steel
	500	Hopper		Press. Steel
	500	Gondola		Std. Steel
	b 3	Caboose		Co. shops
White Eagle Petroleum Co.	an 60	Tank	80,000	Am. C. & F.
	an 40	Tank	100,000	Am. C. & F.
	an 50	Tank	8,000g	Pa. Tank
Wichita Ind. Oil & Ref. Co.	an 10	Tank		Am. C. & F.
Wilhoit Refining Co.	an 10	Tank	100,000	Am. C. & F.
Wilson Car Lines	bn 100	Refrig.	60,000	Has. & Bark.
	an 25	Tank	80,000	Gen'l Am.
	bm 100	Refrig.	60,000	Mil. Refrig.
Wisconsin Lbr. Co.	25	Logging	50,000	Am. C. & F.
Wood, Alan, Iron & Stl. Co.	a 100	Hopper	100,000	Am. C. & F.

ORDERS FROM FOREIGN RAILWAYS

Beth. Chile Iron Mines Co. (Chile)	25	Ore		Press. Steel
Central Adelaida	100	Cane	60,000	Am. C. & F.
Central Australia (Cuba)	50	Cane		Am. C. & F.
Central Canoga	100	Cane		Am. C. & F.
Central Palma (Cuba)	100	Cane	50,000	Am. C. & F.
Cerro de Pasco	a 20	Hopper	80,000	Am. C. & F.
	a 15	Hopper	80,000	Am. C. & F.
Chinese Government Rys.	a 75	Gondola	60,000	Am. C. & F.
	a 75	Gondola	60,000	Am. C. & F.
Cuba R. R.	400	Flat		Am. C. & F.
	425	Cane		Am. C. & F.
	350	Box		Am. C. & F.
	30	Tank		Am. C. & F.
	10	Tank		Am. C. & F.
	9	Refrig.		Am. C. & F.
Cuba Northern	25	Flat		Am. C. & F.
	75	Box		Am. C. & F.
French State Railways	5000			Std. Steel
	2000			Can. C. & F.
	4000		36,000	National
	cm 1000	Gondola	20 M. tons	Eastern
	a 500			Std. Steel
Grace, W. R., & Co. (Chile)	an 10	Tank	66,100	Am. C. & F.
Guantanamo & Western (Cuba)	b 25	Box	80,000	Am. C. & F.
	a 25	Cane	60,000	Am. C. & F.
Havana Central	300	Flat	40,000	Press. Steel
	200	Box	60,000	Press. Steel
	140	Flat	60,000	Std. Steel
	100	Cane	30,000	Am. C. & F.
	10	Hopper		Press. Steel
	b 100	Flat	50,000	Am. C. & F.
	50	N. g. box.	30,000	Am. C. & F.
	50	N. g. flat.		Am. C. & F.
	50	Flat	60,000	Std. Steel
	150	Box	60,000	Std. Steel
	10	Caboose	60,000	Std. Steel
	50	Underframes		Am. C. & F.
Italian State Rys.	3000	Gondola		Am. C. & F.
Marine St. Forg. Co. (France)	25	Gen'l ser.		Press. Steel
Miranda Sugar Co. (Cuba)	80	Cane		Am. C. & F.
Paris-Lyons-Med. (France)	500	Gondola		Press. Steel
	1000	Gondola		Press. Steel
Paris-Orleans (France)	cm 2000	Box	20 M. tons	Eastern
	am 100	Gond.	40 M. tons	Eastern
Russian Government	1000	Gondola	100,000	Std. Steel
	2000	Gondola	100,000	
	155	Gondola		Am. C. & F.
	3500	Pood		Eastern
Spanish-Am. Iron Co. (Cuba)	a 100	Ore	140,000	Am. C. & F.
Tientsin-Pekin (China)	50	Box		Press. Steel

a Indicates all-steel cars.
b Indicates steel underframe cars.
c Indicates steel frame cars.
d Indicates composite underframe cars.
f Indicates all-wood cars.
g Indicates steel end cars.
m Indicates spring draft gear.
n Indicates friction draft gear.

PASSENGER CARS ORDERED IN 1916

Purchaser	No.	Kind	Builder
Alabama Great Southern	axL 8	Coaches	Pullman
	axL 3	Bagg. & exp.	Pullman
	axL 2	Dining	Pullman
Arizona Copper Co.	f 3	Ng. coaches	Am. C. & F.
Arizona Eastern	ax 2	Bagg. & mail	Pullman
	ax 3	Coaches	Pullman
	ax 2	Pass. & bagg.	Pullman
Arms Palace Horse Car Co.	b 20	Horse	Bar. & Smith
Atchison, Topeka & Santa Fe.	ax 10	Jim Crow	Pullman
	ax 25	Baggage	Pullman
Atlantic Coast Line	axN 10	Coaches	Pullman
	axN 6	Express	Pullman
	axN 4	Mail & bagg.	Pullman
	axN 2	Pass. & bagg.	Pullman
	ax 1	Dining	Pullman
Baltimore & Ohio	axN 65	Coach	Pullman
	axN 7	Bagg. & mail	Pullman
Baltimore & Ohio, con.	axN 3	Postal	Pullman
	axN 15	Pass. & bagg.	Pullman
	axN 10	Horse exp.	Pullman
	axy 1	Private	Pullman
Boston & Maine	axL 6	Baggage	Laconia
	axL 2	Bagg. & mail	Laconia
	6	Postal	Osg.-Brad'y
Boston Elevated	ax 42	Elevated	Press. Steel
Cambria & Indiana	axN 1	Stor. battery	Ry. St. Bat.
Can. Gov't Rys. (Inter. Div.)	b 4	Baggage	Co. shops
	b 2	Postal	Co. shops
Can. Gov't Rys. (Trans. Div.)	fx 3	Baggage	Preston

a Indicates all-steel cars.
b Indicates steel underframe cars.
d Indicates composite underframe cars.
f Indicates all-wood cars.
x Indicates electric lighting.
y Indicates gas lighting.
w Indicates oil lighting.
E Cars for electric operation.
L Lead acid batteries.
N Nickel alkaline batteries.

Purchaser	No.	Kind	Builder
Canadian Northern	fx 40	Colonist	Can. C. & F.
	fx 9	Colonist	Crossen
	fx 6	Tourist	Crossen
	fx 3	Baggage	Preston
	fx 5	Baggage	Crossen
	ax 15	Baggage	National
	ax 5	Mail	Preston
	ax 7	Colonist	Crossen
	ax 7	First class	Can. C. & F.
	ax 5	First class	National
	ax 7	Dining	Can. C. & F.
	ax 7	Tourist	Can. C. & F.
	ax 11	Sleeping	Can. C. & F.
	bx 7	Compartment obs.	Can. C. & F.
	bx 2	Compartm't sleep.	Can. C. & F.
	bx 6	Second class	Can. C. & F.
Canadian Pacific	ay 6	Mail	Co. shops
	ay 12	Bagg. & exp.	Co. shops
	ay 7	Baggage	Co. shops
	b 100	Exp. ref.	Co. shops
	axy 1	Private	Pullman
Central of Georgia	axN 6	Sleeping	Pullman
	11	Passenger	Am. C. & F.
Central of New Jersey	ax 25	Coaches	Pullman
	ax 6	Pass. & bagg.	Pullman
	ax 5	Bagg. & exp.	Pullman
	ax 1	Official	Pullman
	ax 2	Cafe	Pullman
Central Vermont	ax 2	Mail	Osg.-Brad'y
Chattahoochee Valley	ax 1	Stor. battery	Ry. St. Bat.
Chesapeake & Ohio	ax 16	Coaches	Pullman
	ax 12	Express	Pullman
	ax 4	Parlor	Pullman
	ax 1	Dining	Pullman
Chicago & Eastern Ill.	axL 8	Baggage	Pullman
Chicago & North Western	aw 24	Coaches	Am. C. & F.
	ay 15	Smoking	Am. C. & F.
	ay 10	Baggage	Am. C. & F.
	ay 3	Postal	Am. C. & F.
	ay 1	Bagg. & mail	Am. C. & F.
	aw 4	Bagg. & mail	Am. C. & F.
Chicago Great Western	axN 1	Postal	Am. C. & F.
	axN 2	Dining	Pullman
	ay 5	Baggage	Pullman
Cincinnati, Ind. & Western	ax 3	Coaches	Am. C. & F.
	ax 1	Dining	Am. C. & F.
	ax 3	Pass. & bagg.	Am. C. & F.
	ax 2	Postal	Am. C. & F.
Cin., New Orleans & Tex. Pac.	axL 12	Coaches	Pullman
	axL 3	Pass. & bagg.	Pullman
	axL 6	Bagg. & exp.	Pullman
	axL 1	Dining	Pullman
Cleve., Cin., Chic. & St. L.	ax 20	Coaches	Bar. & Smith
	ax 5	Pass. & bagg.	Std. Steel
	ax 10	Bagg. & mail	Am. C. & F.
	ax 15	Baggage	Pullman
Delaware & Hudson	ax 1	Private	Pullman
	ax 3	Bagg. & mail	Pullman
Delaware, Lackawanna & West.	axL 45	Coaches	Pullman
	axL 10	Combination	Pullman
	axN 1	Business	Pullman
Duke, J. B.	ax 1	Private	Pullman
Duluth, Missabe & Northern	axL 1	Business	Pullman
Eaton, Sir John	ax 1	Private	Pullman
El Paso & Southwestern	axL 1	Bagg. & mail	Pullman
	axL 4	Bagg. & exp.	Pullman
	axL 2	Coaches	Pullman
	axL 1	Business	Pullman
Erie	axL 7	Coaches	Press. Steel
	axL 1	Combination	Press. Steel
	axL 2	Dining	Bar. & Smith
	by 50	Express	Osg.-Brad'y
Fairburn & Atlanta	axN 3	Stor. battery	Ry. St. Bat.
Flagler, Mrs. H. N.	ax 1	Private	Pullman
Florida East Coast	ax 8	Coaches	Pullman
	ax 3	Baggage	Pullman
	ax 3	Express	Pullman
Gal., Harris. & San Antonio	ay 10	Baggage	Pullman
	ay 12	Bagg. & mail	Pullman
	ax 15	Coaches	Pullman
Grand Rapids & Indiana	ax 3	Pass. & bagg.	Press. Steel
Great Northern	ax 15	Postal	Press. Steel
Green Bay & Western	b 1	Coach	Am. C. & F.
Huntington, H. E.	axy 1	Private	Pullman
Illinois Central	axN 3	Bagg. & mail	Am. C. & F.
	axN 6	Bagg. & mail	Am. C. & F.
	axN 1	Postal	Am. C. & F.
	axN 4	Buffet-bagg.	Pullman
	axN 10	Dining	Pullman
	axN 7	Chair	Pullman
	axN 39	Coaches	Pullman
	axN 6	Compartment	Pullman
	axN 18	Baggage	Pullman
	axN 3	Office	Pullman
International & Gt. Northern	axy 4	Bagg. & mail	Am. C. & F.
	ax 5	Coaches	Am. C. & F.
	ax 2	Dining	Am. C. & F.
Lakeside & Marblehead	a 1	Gaso. Mech. Drive	McKeen
Lehigh Valley	axN 2	Dining	Pullman
	axN 1	Private	Pullman
	axN 25	Bagg. & exp.	Pullman
Long Island	ax 4	Passenger	Am. C. & F.
	axE 15	Coaches	Press. Steel
	axE 45	Trailer	Press. Steel
	a 1	Club	Am. C. & F.
Louisville & Nashville	axL 4	Bagg. & mail	Am. C. & F.
	axL 4	Baggage	Am. C. & F.
	axL 6	Coaches	Am. C. & F.
Louis., Hend. & St. Louis	bx 1	Parlor	Am. C. & F.
McLean	axy 1	Private	Pullman
Maine Central	axN 1	Postal	Pullman
	axN 1	Baggage	Pullman
	axN 1	Express	Pullman
	axN 2	Coaches	Pullman
	axN 1	Smoking	Pullman
Memphis & Rugby	fxN 1	Stor. battery	Ry. St. Bat.
Michigan Central	ax 20	Coaches	Std. Steel
	ax 5	Pass. & bagg.	Std. Steel
	ax 15	Baggage	Am. C. & F.
	ax 10	Baggage	Pullman
Midland Valley	a 1	Gaso. Mech. Drive	McKeen
Mississippi R. & Bonne Terre	ax 1	Bagg. & mail	Am. C. & F.
	ax 2	Coaches	Am. C. & F.
Missouri, Kansas & Texas	ax 10	Baggage	Am. C. & F.
	ax 5	Baggage	Am. C. & F.
	ax 4	Dining	Am. C. & F.
	ax 2	Postal	Am. C. & F.
	ax 10	Baggage	Am. C. & F.
Missouri Pacific	axL 5	Pass. & bagg.	Am. C. & F.
	axL 5	Coach & mail	Am. C. & F.
	axL 6	Dining	Am. C. & F.
Nash., Chatt. & St. Louis	ay 1	Bagg. & mail	Am. C. & F.
	axN 2	Postal	Am. C. & F.
New York Central	ax 5	Coaches	Bar. & Smith
	ax 50	Coaches	Press. Steel
	ax 35	Coaches	Std. Steel
	ax 10	Pass. & bagg.	Std. Steel
	ax 20	Bagg. & mail	Am. C. & F.
	ax 80	Baggage	Am. C. & F.
	ax 1	Private	Pullman
	ax 3	Dining	Co. shops
	axE 12	Multiple-unit	Std. Steel
	ax 25	Baggage	Pullman
New York Consolidated	axE 200	Subway	Am. C. & F.
N. Y., N. H. & H.	axL 65	Coaches	Osg.-Brad'y
	axL 35	Baggage	Osg.-Brad'y
	axL 4	Dining	Pullman
	axL 1	Private	Pullman
	c 25	Milk	Osg.-Brad'y
New York, Phil. & Norfolk	ax 2	Coaches	Press. Steel
Norfolk & Western	axL 1	Officers	Pullman
	ax 8	Pass. & bagg.	Har. & Holl.
	ax 14	Bagg. & mail	Har. & Holl.
	ax 19	Bagg. & exp.	Har. & Holl.
	ax 29	Coaches	Har. & Holl.
(Of these 70 cars, 20 will have lead acid and 50 nickel alkaline batteries.)			
Ohio River & Western	fw 2	Bagg. & mail	Am. C. & F.
Parker Amusement Co., C. W.	f 1		Co. shops
	b 1		Co. shops
Pennsylvania R. R.	ax 50	Coaches	Co. shops
	ax 20	Pass. & bagg.	Co. shops
	ax 5	Baggage	Co. shops
Pennsylvania Lines West	ax 10	Bagg. mail & exp.	Pullman
Philadelphia & Reading	axL 3	Baggage	Co. shops
	axN 2	Cafe	Co. shops
	ax 2	Cafe	Pullman
Pittsburgh & Lake Erie	ax 10	Coaches	Press. Steel
Pullman Co.	ax 293	Sleeping	Pullman
	ax 2	Parlor & exp.	Pullman
	ax 24	Parlor	Pullman
	ax 3	Private	Pullman
Quebec Central	fxL 1	Bagg. & mail	Co. shops
Ringling, John	ax 1	Private	Pullman
St. Louis-San Francisco	ax 3	Chair	Am. C. & F.
	ax 1	Coach	Am. C. & F.
Schwab, Charles M.	ax 1	Private	Pullman
Seaboard Air Line	axN 15	Express	Press. Steel
	axN 2	Obs. dining	Pullman
	axN 3	Dining	Pullman
	ax 2	Gas-elec.	Gen'l Elec.
Southern	axL 25	Coaches	Pullman
	axL 10	Pass. & bagg.	Pullman
	axL 10	Mail & bagg.	Pullman
	axL 10	Bagg. & exp.	Pullman
	axL 5	Club	Pullman
Southern Pacific	ay 6	Bagg. & mail	McKeen
Southern Utah	a 1	Gaso. Mech. Drive	McKeen
Texas & Pacific	axN 8	Mail & bagg.	Am. C. & F.
Towson & Cockeysville	fxN 1	Stor. battery	Ry. St. Bat.
Union Pacific	ay 5	Bagg. & mail	Pullman
	axy 1	Private	Pullman
	a 1	Gaso. Mech. Drive	McKeen
	a 1	Gaso. Mech. Drive	McKeen
Unit Car Company	ax 1	Pass., bagg. & mail	Laconia
Wabash	ax 12	Postal	Am. C. & F.
Western Maryland	axL 15	Coaches	Pullman
	axL 2	Pass. & bagg.	Pullman
	axL 2	Cafe-Parlor	Pullman
	axL 6	Baggage	Pullman

ORDERS FROM FOREIGN RAILWAYS

Am. R. R. of Porto Rico	6	First class	Am. C. & F.
Chile State Rys. (So. America)	fx 24	Passenger	Osg.-Brad'y
Cuba Co.	bx 6	Second class	Am. C. & F.
	bx 1	First class	Am. C. & F.
	bx 1	First & obs.	Am. C. & F.
	bx 2	Bagg. & exp.	Am. C. & F.
	bx 2	Mail, bagg. & exp.	Am. C. & F.
	bx 4	Second class	Am. C. & F.
	bx 2	Sleeping	Am. C. & F.
Havana Central	3	Coaches	Wason
	5	Bagg. & mail	Wason
	f 5	Coaches	Am. C. & F.
	f 2	Pass. & bagg.	Am. C. & F.
Iquique Tramways	fxN 1	Stor. battery	Ry. St. Bat.
Norte de Cuba	a 1	Gaso. Mech. Drive	McKeen

a Indicates all-steel cars.
b Indicates steel underframe cars.
d Indicates composite underframe cars.
f Indicates all-wood cars.
x Indicates electric lighting.
y Indicates gas lighting.
w Indicates oil lighting.
E Cars for electric operation.
L Lead acid batteries.
N Nickel alkaline batteries.

LOCOMOTIVES ORDERED IN 1916

Purchaser	No.	Cylinders	Weight	Type	Super-heater	Brick arch	Valve gear	Automatic stoker	Builder
Alabama Great Southern	2	27 x 28	315,500	4-8-2	Yes	Yes	Southern	.....	Baldwin
	6	27 x 30	285,000	2-8-2	Yes	Yes	Southern	.....	Lima
	4	24 x 28	208,700	0-8-0	Yes	No	Southern	.....	Lima
Alabama Co.	1	19 x 26	122,000	0-6-0	No	Yes	.....	.....	Baldwin
Alexandria & Western	1	16 x 24	90,000	2-6-0	No	Yes	.....	.....	Baldwin
Algoma Eastern	2	22 x 28	191,500	2-8-0	Yes	Yes	Walschaert	.....	Canadian
Aluminum Co. of America	1	22 x 28	203,000	0-8-0	Yes	Yes	.....	.....	American
American Car & Foundry Co	1	18 x 24	100,000	0-6-0	No	Yes	.....	.....	Baldwin
American Manganese Steel Co	1	.....	58,000	0-4-0	...	...	.....	.....	American
American Rolling Mill Co	2	21 x 26	140,000	0-6-0	No	Yes	Stephenson	.....	Baldwin
	2	16 x 24	94,000	0-4-0	No	No	Richardson	.....	American
American Sheet & Tin Plate Co	1	19 x 26	120,700	0-6-0	No	Yes	.....	.....	Baldwin
American Steel & Wire Co	1	10 x 16	37,100	0-4-0	No	No	.....	.....	Baldwin
Ann Arbor	3	27 x 30	265,000	2-8-2	Yes	Yes	Baker	.....	American
Arizona Eastern R. R. Co	2	25 x 28	.....	4-6-2	Yes	...	.....	.....	Lima
	2	26 x 28	.....	2-8-2	Yes	...	.....	.....	Lima
Arizona Lumber & Timber Co	1	20 x 28	174,000	2-8-2	No	No	.....	.....	Baldwin
	1	3-12 x 15	140,000	Shay	...	...	.....	.....	Lima
Asbestos & Asbestic Co	1	13 x16	60,000	0-6-0	No	No	.....	.....	Canadian
Ashland Coal & Iron	1	22 x 28	204,000	2-8-0	Yes	Yes	.....	.....	American
Ashland, Odanah & Marengo	1	17 x 24	116,800	2-6-2	No	Yes	.....	.....	Baldwin
Atchison, Topeka & Santa Fe	28	25 x 32	292,400	2-8-2	Yes	Yes	Baker	Street	Baldwin
Atlanta, Birmingham & Atlantic	3	27 x 30	316,000	2-10-2	Yes	Yes	Baker	.....	Baldwin
Atlantic Coast Line	10	22 x 28	227,300	4-6-2	Yes	Yes	Walschaert	.....	Baldwin
	2	19 x 24	129,550	0-6-0	Yes	Yes	Southern	.....	Baldwin
	20	23 x 28	252,000	4-6-2	Yes	Yes	Walschaert	.....	Baldwin
	5	20 x 24	133,500	0-6-0	Yes	Yes	Walschaert	.....	Baldwin
Atlas Export & Trading Co	1	9 x 14	29,000	0-4-0	...	...	.....	.....	Lima
Babcock & Wilcox Co	1	18 x 24	147,500	2-6-2	No	Yes	.....	.....	Baldwin
Baker Co., R. D.	1	2-6 x 10	26,000	Shay	...	...	.....	.....	Lima
Baltimore & Ohio	50	26 x 32	281,900	2-8-2	Yes	Yes	Baker	Street	Baldwin
	10	22 x 26	178,500	2-6-0	Yes	Yes	Baker	.....	Lima
	30	.....	.....	Mallet	Yes	Yes	.....	Street	Baldwin
	10	.....	.....	4-6-2	Yes	Yes	.....	.....	Baldwin
Bangor & Aroostook	1	23 x 30	208,000	2-8-0	Yes	Yes	Baker	.....	American
Barfield Lumber Co	1	13 x 22	76,400	2-6-2	No	No	.....	.....	Baldwin
Bell, A. E.	1	12 x 18	60,800	2-6-2	No	No	.....	.....	Baldwin
Bessemer & Lake Erie	20	30 x 32	404,250	2-10-2	Yes	Yes	Baker	Street	Baldwin
Bethlehem Steel Co	2	22 x 28	196,000	0-8-0	...	...	.....	.....	American
	4	17 x 20	92,400	0-4-0	No	No	.....	.....	Baldwin
	2	21 x 26	143,700	0-6-0	No	Yes	.....	.....	Baldwin
	2	21 x 26	150,000	0-6-0	No	Yes	.....	.....	Baldwin
	1	19 x 26	122,000	0-6-0	No	Yes	.....	.....	Baldwin
	6	21 x 26	150,000	0-6-0	No	Yes	.....	.....	Baldwin
Big Creek Logging Co	1	3-11 x 12	90,000	Shay	...	...	.....	.....	Lima
Bingham & Garfield	2	26 & 41 x 28	457,000	0-8-8-0	Yes	Yes	Walschaert	.....	American
	2	22 x 26	169,700	0-6-0	Yes	No	Walschaert	.....	Baldwin
	4	21 x 24	156,000	0-6-0	Yes	No	.....	.....	Baldwin
Birdsboro Stone Co	1	21 x 26	138,400	0-6-0	No	Yes	.....	.....	Baldwin
Birmingham Southern	4	28 x 32	353,000	2-10-2	Yes	Yes	.....	.....	American
	2	22 x 26	160,000	0-6-0	Yes	...	.....	.....	American
Bloedel-Donovan Lumber Co	1	3-12 x 15	140,000	Shay	...	...	.....	.....	Lima
Blount-Decker Lumber Co	1	15 x 24	94,000	2-6-2	No	No	.....	.....	Baldwin
Boston & Maine	23	20 x 26	148,000	0-6-0	Yes	Yes	Baker	.....	American
	2	25 x 30	230,000	0-8-0	Yes	Yes	Baker	.....	American
	25	24 x 30	210,000	2-8-0	Yes	Yes	Walschaert	.....	American
	10	22 x 28	235,000	4-6-2	Yes	Yes	Walschaert	.....	American
	2	.....	.....	Electric	...	...	.....	.....	Westinghouse
Buffalo Creek	3	21 x 28	211,000	0-8-0	Yes	Yes	Walschaert	.....	American
Buffalo, Rochester & Pittsburgh	10	26½ x 30	278,000	2-8-2	Yes	Yes	Walschaert	Street	American
	5	23½ & 37 x 32	429,000	2-6-6-2	Yes	Yes	Walschaert	Street	American
Bush Terminal Co	1	18 x 24	102,000	0-4-0	No	No	.....	.....	Baldwin
	1	.....	120,000	4-0-4	Electric switch		.....	.....	Gen. Electric
Butler Bros.	1	19 x 26	122,500	0-6-0	No	Yes	.....	.....	Baldwin
Butte, Anaconda & Pacific	6	.....	164,000	Elec. frght.	...	...	.....	.....	Gen. Electric
C. & O. Lumber Co	1	3-12 x 15	140,000	Shay	...	...	.....	.....	Lima
Cal. State Board of Harbor Comm	1	20 x 24	145,200	0-6-0	No	No	.....	.....	Baldwin
Calumet & Arizona Mining Co	4	19 x 26	133,000	0-6-0	Yes	...	.....	.....	American
Calumet, Hammond & Southeastern	3	19 x 24	123,000	0-6-0	No	Yes	.....	.....	Baldwin
Cambria & Indiana	2	22 x 28	231,550	2-8-2	Yes	Yes	Walschaert	.....	Lima
Campbell Bros. Lumber Co	1	3-10 x 12	84,000	Shay	...	...	.....	.....	Lima
Canadian Government Rys. (Intercolonial Div.)	10	26 x 32	324,000	2-10-2	Yes	Yes	Walschaert	.....	Montreal
Canadian Government Rys. (Transcont. Div.)	*30	27 x 30	283,000	2-8-2	Yes	Yes	Walschaert	.....	Canadian
	1	.....	.....	Snow plow	...	...	.....	.....	American
Canadian Northern	*1	.....	.....	Snow plow	...	...	.....	.....	American
Canadian Northern Ry. System	6	.....	.....	Electric	...	...	.....	.....	Can. Gen. El. Co.
Canton	1	21 x 28	162,000	0-6-0	No	Yes	Southern	.....	Baldwin
Carnegie Steel Co	1	13 x 16	56,000	0-4-0	No	No	.....	.....	Baldwin
	4	22 x 28	176,000	0-6-0	Yes	Yes	.....	.....	Baldwin
	3	22 x 28	173,000	0-6-0	No	No	.....	.....	Baldwin
Carney Mill Co., W. M.	1	3-12 x 15	140,000	Shay	...	...	.....	.....	Lima
Central of New Jersey	10	.....	.....	4-6-0	...	...	.....	.....	Baldwin
Central R. R. of New Jersey	10	24 x 30	234,000	0-8-0	No	No	Walschaert	.....	American
	3	24 x 30	234,000	0-8-0	No	No	Walschaert	.....	Company shops
Central Steel Co	2	21 x 26	158,000	0-6-0	...	...	.....	.....	American
Chemical Lime Co	1	8 x 14	21,000	0-4-0	No	No	.....	.....	Baldwin
Cherry River Boom & Lumber Co	1	16 x 24	93,000	2-6-0	No	No	.....	.....	Baldwin
	1	3-14½ x 15	180,000	Shay	...	...	.....	.....	Lima
Chicago & Northwestern	18	25 x 28	260,000	4-6-2	Yes	Yes	Baker	.....	American
	6	22 x 26	299,000	4-6-2	Yes	Yes	Baker	.....	American
	50	27 x 32	302,000	2-8-2	Yes	Yes	Baker	.....	American
	43	18 x 24	140,500	0-6-0	Yes	Yes	Baker	.....	American
	25	21 x 28	171,000	0-6-0	Yes	Yes	Baker	.....	American
Chesapeake & Ohio	25	22 & 35 x 32	434,000	2-6-6-2	Yes	Yes	Walschaert	Duplex	American
	25	22 & 35 x 32	434,000	2-6-6-2	Yes	Yes	Walschaert	Duplex	American
Chicago & Calumet River	1	20 x 26	129,000	0-6-0	...	...	.....	.....	American
Chicago, Burlington & Quincy	15	27 x 30	266,500	2-8-2	Yes	Yes	Walschaert	.....	Baldwin
	25	28 x 32	315,400	2-8-2	Yes	Yes	Walschaert	Street	Baldwin
	10	30 x 32	367,850	2-10-2	Yes	Yes	Walschaert	Street	Baldwin
Chicago Great Western	10	21 x 26	155,000	0-6-0	Yes	Yes	Walschaert	.....	Baldwin
	3	25 x 28	259,400	4-6-2	Yes	Yes	Walschaert	.....	Baldwin
	7	30 x 32	347,400	2-10-2	Yes	Yes	Walschaert	.....	Baldwin
Chic., Indianapolis & Louisv. (Monon Route)	3	26 x 28	290,000	4-6-2	Yes	Yes	Walschaert	.....	American
	3	28 x 30	350,000	2-10-2	Yes	Yes	Walschaert	.....	American
Chicago Junction	10	20 x 26	150,000	0-6-0	Yes	Yes	.....	.....	American
Chicago River & Indiana	1	20 x 26	148,000	0-6-0	Yes	Yes	.....	.....	American
Chicago, St. Paul, Minneapolis & Omaha	2	25 x 28	260,000	4-6-2	Yes	Yes	Baker	.....	American
	10	27 x 32	302,000	2-8-2	Yes	No	Baker	.....	American
	9	21 x 28	171,000	0-6-0	Yes	No	Baker	.....	American
	2	27 x 32	342,000	2-10-2	No	No	Walschaert	.....	Baldwin
Chicago Short Line	1	21 x 26	141,000	0-6-0	No	Yes	.....	.....	Baldwin
Cincinnati, New Orleans & Texas Pacific	5	27 x 28	315,500	4-8-2	Yes	Yes	Southern	.....	Baldwin
	4	24 x 28	208,700	0-8-0	Yes	No	Southern	.....	Lima

Purchaser	No.	Cylinders	Weight	Type	Super-heater	Brick arch	Valve gear	Automatic stoker	Builder
Clear Lake Lumber Co	1	20½ x 28	160,500	2-8-2	Yes	No	.....	.....	Baldwin
Cleveland, Cin., Chicago & St. L	5	.....	273,000	4-6-2	Yes	Yes	.....	.....	American
Coal & Coke	2	23 x 28	199,800	2-8-0	No	Yes	Baker	.....	Baldwin
Columbia & Nehalem River	1	18 x 24	141,150	2-8-0	No	Yes	.....	.....	**Baldwin**
	1	17 x 24	117,800	2-6-2	No	No	.....	.....	Baldwin
Copper River & No. West	1	20 x 28	195,000	2-8-2	Yes	...	.....	.....	American
Cowell Lime & Cement Co., Henry	1	12 x 16	48,800	0-4-0	No	No	.....	.....	Baldwin
Cornwall	1	21 x 26	139,000	0-6-0	No	Yes	.....	.....	Baldwin
Cornwall Ore Bank Co	1	22 x 26	150,000	0-6-0	No	No	.....	.....	Baldwin
Cramp & Sons Ship Bldg. Co., Wm	1	14 x 22	67,000	0-4-0	No	No	.....	.....	Baldwin
Croft Lumber Co	1	3-12 x 15	140,000	Shay	...	...	.....	.....	Lima
Danaher Lumber Co	1	3-12 x 15	140,000	Shay	...	...	.....	.....	Lima
Davis Supply Co	2	3-12 x 15	140,000	Shay	...	...	.....	.....	Lima
Deemer Mfg. Co	1	3-11 x 12	100,000	Shay	...	...	.....	.....	Lima
Deer Island Logging Co	1	17 x 24	118,000	2-6-2	No	No	.....	.....	Baldwin
Delaware, Lackawanna & Western	5	25 x 28	312,000	4-6-2	Yes	Yes	Baker	.....	American
	10	22 x 28	208,000	0-8-0	Yes	Yes	Baker	.....	Company shops
	7	25 x 28	295,000	4-6-2	Yes	Yes	Baker	.....	American
	10	28 x 30	321,000	2-8-2	Yes	Yes	Baker	.....	American
Delray Connecting R. R	2	22 x 28	208,000	0-8-0	Yes	Yes	Walschaert	.....	American
Denver & Rio Grande	10	31 x 32	420,000	2-10-2	Yes	Yes	Baker	Street	American
Denver & Salt Lake	5	21 & 33½ x 32	361,000	2-6-6-0	Yes	Yes	Walschaert	.....	American
	2	26 x 30	305,000	2-8-2	Yes	Yes	Walschaert	.....	American
Detroit Terminal	3	21 x 28	172,000	0-6-0	Yes	...	.....	.....	American
	3	21 x 28	173,000	0-6-0	Yes	...	.....	.....	American
Detroit, Toledo & Ironton	2	25 x 30	250,000	2-8-2	Yes	Yes	Baker	.....	American
Donora Southern	1	22 x 26	163,000	0-6-0	Yes	No	Stephenson	.....	Baldwin
Duluth, Missabe & Northern	4	24 x 28	220,000	0-8-0	Yes	Yes	Walschaert	.....	Baldwin
	2	26 & 40 x 32	470,000	2-8-8-2	Yes	Yes	Walschaert	Street	Baldwin
Duluth, Winnipeg & Pac	10	24 x 32	240,000	2-8-0	Yes	Yes	.....	.....	American
East Broad Top	1	20 x 24	163,000	4-6-2	Yes	No	Walschaert	.....	Baldwin
East Jersey R. R. & Terminal Co	1	19 x 24	127,700	0-8-0	No	No	.....	.....	Baldwin
East Oregon Lumber Co	1	18 x 24	139,000	2-8-2	No	No	.....	.....	Baldwin
East Tennessee & Western North Carolina	1	16 x 22	98,800	4-6-0	No	No	Walschaert	.....	Baldwin
El Paso & Southwestern	5	29 x 30	321,000	2-8-2	Yes	Yes	Baker	Street	American
	10	27 x 28	312,000	4-6-2	Yes	Yes	Walschaert	.....	American
Erie	10	31 x 32	417,200	2-10-2	Yes	Yes	Baker	Hanna	Baldwin
	3	31 x 32	417,200	2-10-2	Yes	Yes	Baker	Hanna	Lima
	10	31 x 32	401,000	2-10-2	Yes	Yes	Baker	Street	American
	15	31 x 32	401,000	2-10-2	Yes	Yes	Baker	Street	American
	2	7¾ x 12	44,000	0-4-0	(Gasoline switch)		.....	.....	Baldwin
	10	27 x 28	284,810	4-6-2	Yes	Yes	Baker	.....	American
	3	20 x 26	148,100	0-6-0	Yes	Yes	Baker	.....	Company shops
Escanaba & Lake Superior	1	19 x 26	142,500	4-6-0	Yes	Yes	Walschaert	.....	Baldwin
Eureka Nevada	1	.....	.....	2-6-2	...	...	.....	.....	Porter
Evansville Suburban & Newburgh	1	17 x 24	106,100	2-6-0	No	No	.....	.....	Baldwin
Fairport, Painesville & Eastern	1	.....	.....	0-6-0	Yes	Yes	.....	.....	Baldwin
Finkbine Lumber Co	1	3-12 x 15	140,000	Shay	...	...	.....	.....	Lima
Flagstaff Lumber Mfg. Co	1	19 x 24	123,500	2-8-0	No	No	.....	.....	Baldwin
Florida East Coast	10	22 x 26	204,000	4-6-2	Yes	...	.....	.....	American
	2	20 x 26	146,000	0-6-0	Yes	...	.....	.....	American
Fort Smith & Western	3	22 x 28	200,300	2-8-2	Yes	Yes	Southern	.....	Baldwin
Galveston, Harrisburg & San Antonio	10	26 x 28	.....	2-8-2	Yes	...	.....	.....	American
General Chemical Co	1	22 x 26	156,700	0-6-0	No	Yes	.....	.....	.....
General Refractories Co	1	12 x 16	46,000	0-4-0	No	No	.....	.....	Baldwin
	2	19 x 26	.....	4-6-0	No	Yes	Stephenson	.....	American
Golden State Portland Cement Co	1	3-8 x 10	56,000	Shay	...	...	.....	.....	Lima
Goodman Lumber Co	1	3-10 x 10	72,000	Shay	...	...	.....	.....	Lima
Granby Mining & Smelting Co	1	8 x 12	17,000	0-4-0	No	No	.....	.....	Baldwin
Grand Rapids	1	.....	.....	Electric	...	...	.....	.....	Company shops
Great Lakes Stone & Lime Co	1	12 x 18	53,000	0-4-0	No	No	.....	.....	Baldwin
Great Northern	25	28 x 32	306,000	2-8-2	Yes	No	Walschaert	Street	Baldwin
	50	28 x 32	306,000	2-8-2	Yes	...	Walschaert	Street	Baldwin
Green Bay & Western	1	19 x 26	139,000	2-6-0	Yes	Yes	.....	.....	American
Gulf States Steel Co	1	19 x 26	120,000	0-6-0	No	Yes	.....	.....	Baldwin
Guthrie, A., & Co., Inc	1	20 x 26	135,000	0-6-0	No	No	.....	.....	Baldwin
	1	3-12 x 15	140,000	Shay	...	...	.....	.....	Lima
	1	3-12 x 15	140,000	Shay	...	...	.....	.....	Lima
Hardaway Contracting Co	1	17 x 24	113,200	0-6-0	No	No	.....	.....	Baldwin
Henderson Land & Lumber Co	1	3-10 x 12	84,000	Shay	...	...	.....	.....	Lima
Hocking Valley	5	22 & 35 x 32	428,000	2-6-6-2	Yes	Yes	Walschaert	Street	American
Holston River Lumber Co	1	3 12 x 15	140,000	Shay	...	...	.....	.....	Lima
Holston Valley Lumber Co	1	3 12 x 15	140,000	Shay	...	...	.....	.....	Lima
Houston & Texas Central	10	26 x 28	.....	2-8-2	Yes	...	.....	.....	American
Humbird Lumber Co	1	20½ x 28	177,400	2-8-2	Yes	Yes	.....	.....	Baldwin
Hume-Bennett Lumber Co	1	3-8 x 12	64,000	Shay	...	...	.....	.....	Lima
Hutchinson Lumber Co	1	2-8 x 12	40,000	Shay	...	...	.....	.....	Lima
Illinois Central	20	26 x 28	278,000	4-6-2	Yes	Yes	Walschaert	.....	American
Illinois Northern	1	.....	.....	Switch	...	...	.....	.....	Baldwin
Illinois Terminal	1	20 x 24	121,000	2-6-0	No	No	.....	.....	Baldwin
Illinois Traction Sys	6	.....	120,000	Freight elec. equips. only			.....	.....	Gen. Electric
Indiana Harbor Belt	20	25 x 32	294,000	2-8-2	Yes	Yes	.....	.....	American
	10	25 x 30	240,000	0-8-0	Yes	Yes	Baker	.....	American
Industrial Lumber Co	1	16 x 24	107,600	2-6-2	No	No	.....	.....	Baldwin
Ingersoll-Rand Co	1	18 x 24	119,450	0-6-0	No	Yes	.....	.....	Baldwin
Inland Steel Co	1	21 x 26	154,400	0-6-0	No	Yes	.....	.....	Baldwin
	2	.....	.....	....	...	...	.....	.....	Vulcan
Intermountain Railway	2	3-12 x 15	140,000	Shay	...	...	.....	.....	Lima
Interstate	1	20 x 26	181,000	4-4-2	No	Yes	Southern	.....	Baldwin
Interurban Ry. Co	1	.....	120,000	Electric	...	...	.....	.....	McGuire Cum'gs
Jacksonville, Fla., Port Comm	1	19 x 26	123,500	0-6-0	No	No	.....	.....	Baldwin
Jonesboro, Lake City & Eastern	2	18 x 24	111,850	2-6-0	Yes	No	Walschaert	.....	Baldwin
Kaiser, J. H., Lumber Co	1	3-10 x 12	84,000	Shay	...	...	.....	.....	Lima
Kelley Island Lime & Trans Co	1	2-8 x 12	40,000	Shay	...	...	.....	.....	Lima
	1	2-8 x 12	40,000	Shay	...	...	.....	.....	Lima
	7	3-8 x 8	48,000	Shay	...	...	.....	.....	Lima
Korber, Wm., & Co	1	3-8 x 10	56,000	Shay	...	...	.....	.....	Lima
Kress, F. J., Box Co	1	3-8 x 10	56,000	Shay	...	...	.....	.....	Lima
La Belle Iron Works	1	19 x 26	116,100	0-6-0	No	Yes	.....	.....	Baldwin
Lackawanna Iron & Steel Co	1	18 x 24	103,500	0-6-0	No	Yes	.....	.....	Baldwin
Lackawanna Steel Co	1	17 x 20	100,000	0-4-0	No	No	.....	.....	Vulcan
Laclede Gas Light Co	1	18 x 24	106,000	0-6-0	...	...	.....	.....	American
Lake Terminal	3	25 x 30	225,100	0-8-0	No	Yes	Walschaert	.....	Baldwin
	1	25 x 30	225,600	0-8-0	Yes	Yes	Walschaert	.....	Baldwin
Lehigh Valley	20	27 x 30	325,200	2-8-2	Yes	Yes	Walschaert	Street	Baldwin
	30	27 x 28	302,000	4-6-2	Yes	Yes	Wal. and Baker	Street	Baldwin
	40	29 x 32	374,000	2-10-2	Yes	Yes	Wal. and Baker	Street	Baldwin
	15	21 x 28	173,500	Switch	No	No	.....	.....	Baldwin
Ligonier Valley	1	21 x 28	178,000	2-8-0	No	Yes	.....	.....	Baldwin
Lightsey Bros., Inc	1	12 x 16	55,000	2-6-2	No	No	.....	.....	Baldwin
Little River Lumber Co	1	3-12 x 15	140,000	Shay	...	...	.....	.....	Lima
Long Island	4	23 x 28	195,000	0-8-0	Yes	...	.....	.....	American
	6	21 x 26	178,000	4-6-0	Yes	Yes	.....	.....	American

Purchaser	No.	Cylinders	Weight	Type	Super-heater	Brick arch	Valve gear	Automatic stoker	Builder
Lorain Steel Co	1	21 x 26	141,000	0-6-0	No	Yes	.....	.....	Baldwin
Louisiana & Arkansas	2	22 x 28	194,000	4-6-0	Yes	No	Southern	.....	Baldwin
Louisiana & Pacific	1	19 x 24	133,400	2-8-0	No	No	Walschaert	.....	Baldwin
Louisville & Nashville	12	27 x 30	302,000	2-8-2	Yes	Yes	Walschaert	.....	Company shops
	4	23½ x 30	218,000	0-8-0	Yes	Yes	Walschaert	.....	Company shops
Lyon Lumber Co	1	12 x 18	62,000	2-6-2	No	No	.....	.....	Baldwin
Lyon Pine Co	1	12 x 18	62,000	2-6-2	No	No	.....	.....	Baldwin
McCoy Loggie Timber Co	1	3-13½ x 15	160,000	Shay	...	...	.....	.....	Lima
McKeesport Connecting	2	22 x 28	162,500	0-6-0	No	No	.....	.....	Baldwin
McNeal & Lloyd	1	2-6 x 10	26,000	Shay	...	...	.....	.....	Lima
Maine Central	2	21 x 28	165,000	0-6-0	Yes	Yes	Walschaert	.....	American
	6	26½ x 30	275,000	2-8-2	Yes	Yes	Walschaert	.....	American
	2	21 x 28	166,000	0-6-0	Yes	Yes	.....	.....	American
	3	25 x 28	260,000	4-6-2	...	...	.....	.....	American
	4	26½ x 30	275,000	2-8-2	...	...	.....	.....	American
	2	21 x 28	166,000	0-6-0	...	...	.....	.....	American
Mandle Clay Mining Co	1	9 x 14	29,150	0-4-0	No	No	.....	.....	Baldwin
Marble Cliff Quarries Co	1	3-10 x 10	72,000	Shay	...	...	.....	.....	Lima
Mardez Lumber Co	1	15 x 20	82,050	2-6-0	No	No	.....	.....	Baldwin
Mark Mfg. Co	3	14 x 22	81,000	0-4-0	No	No	.....	.....	Baldwin
	1	21 x 26	158,000	0-6-0	Yes	Yes	.....	.....	Baldwin
	1	21 x 26	158,000	0-6-0	Yes	Yes	.....	.....	Baldwin
Marsch, John	6	16 x 24	83,750	0-6-0	No	Yes	.....	.....	Baldwin
Mellen Lumber Co	1	16 x 24	100,900	2-6-2	No	Yes	.....	.....	Baldwin
Michigan Alkali Co	1	19 x 24	115,000	0-6-0	No	Yes	.....	.....	Baldwin
Michigan Central	5	.....	273,000	4-6-2	Yes	Yes	.....	.....	American
	2	26 & 40 x 28	466,000	0-8-8-0	Yes	Yes	.....	.....	American
Midland Valley	2	22 x 28	200,500	2-8-2	Yes	Yes	Southern	.....	Baldwin
Minden Coal Co	1	9 x 14	25,200	0-4-0	No	No	.....	.....	Baldwin
Mineral Range	2	24 x 30	224,500	2-8-0	Yes	Yes	Walschaert	.....	American
Minneapolis & St. Louis	10	21 x 28	172,000	0-6-0	Yes	Yes	Baker	.....	American
Minn., Anoka & Cayuna Elec	1	.....	.....	Electric	...	...	.....	.....	McGuire Cum'gs
Minnesota, Dakota & Western	1	20 x 26	151,000	2-8-0	No	No	Baker	.....	Baldwin
Minnesota Steel Co	1	19 x 22	124,000	0-6-0	Yes	Yes	.....	.....	Baldwin
	1	23 x 28	203,000	0-8-0	...	...	.....	.....	American
Minnesota Transfer	2	24 x 28	208,000	0-8-0	Yes	No	Southern	No. Am.	Lima
Mississippi Eastern	1	19 x 26	135,500	4-6-0	No	Yes	.....	.....	Baldwin
Mississippi River & Bonne Terre	2	21 x 26	189,000	4-6-2	Yes	No	Walschaert	.....	Baldwin
	2	.....	.....	4-6-0	...	...	.....	.....	American
Missouri, Kansas & Texas	1	9 x 14	28,700	0-4-0	No	No	Stephenson	.....	American
	5	25 x 28	272,000	4-6-2	Yes	Yes	Baker	.....	American
	5	25 x 28	272,000	4-6-2	Yes	Yes	Walschaert	.....	American
Missouri Pacific	14	30 x 32	370,000	2-10-2	Yes	Yes	Walschaert	Street	American
Moltz, Jerome	1	3-11 x 12	100,000	Shay	No	No	.....	.....	Lima
Monongahela Connecting	8	21 x 26	152,000	....	...	...	Walschaert	.....	Porter
	1	23 x 28	195,000	0-8-0	Yes	Yes	Walschaert	.....	Porter
Montour	8	27 x 32	297,000	2-8-2	Yes	Yes	Baker	.....	American
National Slag Co	2	20 x 26	157,000	0-6-0	No	Yes	.....	.....	Baldwin
Neame, Carson & Southern	1	3-12 x 15	113,000	Shay	No	No	Stephenson	.....	Lima
Nekooska & Edwards Paper Co	1	.....	.....	....	...	...	.....	.....	Davenport
Nettleton-Bruce Logging Co	1	3-11 x 12	100,000	Shay	...	...	.....	.....	Lima
Nevada Consolidated Copper Co	2	19 x 26	162,000	0-6-2	Yes	No	.....	.....	Baldwin
	2	.....	.....	0-6-2	...	...	.....	.....	Baldwin
Nevada Northern	1	21 x 30	200,000	2-8-0	Yes	Yes	.....	.....	American
	1	21 x 26	176,000	2-8-0	Yes	Yes	.....	.....	Baldwin
Newburgh & South Shore	2	23 x 26	185,500	2-6-0	Yes	Yes	Walschaert	.....	Baldwin
New Jersey Zinc Co	1	21 x 26	146,000	0-6-0	No	No	Walschaert	.....	Baldwin
Newton Falls Paper Co	1	3-12 x 12	120,000	Shay	...	...	.....	.....	Lima
New York Central	10	23½ x 26	273,000	4-6-2	Yes	Yes	.....	.....	American
	5	21½ & 34 x 32	354,000	2-6-6-2	Yes	Yes	.....	.....	American
	55	28 x 28	343,000	4-8-2	Yes	Yes	.....	.....	American
	45	23½ x 30	213,000	0-8-0	Yes	Yes	.....	.....	American
	70	25 x 32	283,100	2-8-2	Yes	Yes	.....	.....	Lima
	50	25 x 30	215,000	0-8-0	Yes	Yes	.....	.....	Lima
	60	23½ x 37	215,000	0-8-0	Yes	Yes	.....	.....	Lima
	55	28 x 28	343,000	4-8-2	Yes	Yes	.....	.....	Lima
	25	23½ x 30	280,000	0-8-0	Yes	Yes	.....	.....	Lima
	10	.....	250,000	4-4-4-4	Elec.	Pass.	.....	.....	Gen. Electric
	25	21½ & 34 x 32	354,000	2-6-6-2	Yes	Yes	.....	.....	American
	1	26 & 40 x 28	466,000	0-8-8-0	Yes	Yes	.....	.....	American
	29	.....	345,000	4-8-2	Yes	Yes	.....	.....	American
	25	.....	240,000	0-8-0	Yes	Yes	.....	.....	American
New York, Chicago & St. Louis	10	21 x 28	173,500	0-6-0	Yes	Yes	Walschaert	.....	American
	10	25 x 32	284,000	2-8-2	Yes	Yes	Baker	.....	Lima
	10	21 x 28	173,500	0-6-0	Yes	Yes	Walschaert	.....	Lima
	25	25 x 32	284,000	2-8-2	Yes	Yes	Walschaert	.....	American
New York, New Haven & Hartford	50	26 x 28	266,000	4-6-2	Yes	Yes	Baker	.....	American
Norfolk & Portsmouth Belt Line	1	20 x 24	135,000	0-6-0	No	Yes	.....	.....	Baldwin
Norfolk & Western	5	22 & 35 x 32	412,000	2-8-8-2	Yes	Yes	Baker	Hanna	American
	5	22 & 35 x 32	412,000	2-8-8-2	Yes	Yes	Baker	Standard	American
	10	22 & 35 x 32	412,000	2-8-8-2	Yes	Yes	Baker	Street	American
	4	29 x 28	347,000	4-8-2	Yes	Yes	Baker	Standard	Company shops
	4	29 x 28	347,000	4-8-2	Yes	Yes	Baker	Standard	Company shops
	1	.....	.....	Mallet	Yes	...	.....	Duplex	Company shops
Oklahoma Portland Cement Co	1	3-11 x 12	100,000	Shay	...	...	.....	.....	Lima
Oneida & Western	1	19 x 26	142,000	2-8-0	No	Yes	.....	.....	Baldwin
Oregon Short Line	1	.....	.....	Snow plow	...	...	.....	.....	American
Orenstein-Arthur Koppel Co	1	3-8 x 8	48,000	Shay	...	...	.....	.....	Lima
Pacific Commercial Co	1	3-8 x 10	56,000	Shay	...	...	.....	.....	Lima
Pacific Light & Power Co	2	3-11 x 12	120,000	Shay	...	...	.....	.....	Lima
Palmer, George, Lumber Co	1	3-15 x 17	200,000	Shay	...	...	.....	.....	Lima
Patterson & Western	1	2-7 x 12	36,000	Shay	...	...	.....	.....	Lima
	1	2-7 x 12	36,000	Shay	...	...	.....	.....	Lima
Paxson, J. W., Co	2	.....	.....	0-4-0	...	...	.....	.....	Baldwin
Peninsular	1	20½ x 28	179,100	2-8-2	No	Yes	.....	.....	Baldwin
Pennsylvania	75	27 x 30	314,200	2-8-2	Yes	Yes	.....	.....	Baldwin
	45	.....	.....	2-8-2	Yes	Yes	.....	.....	Company shops
	50	.....	.....	0-6-0	Yes	Yes	.....	.....	Company shops
	10	.....	.....	0-4-0	Yes	Yes	.....	.....	Company shops
Pennsylvania Lines West of Pittsburgh	25	27 x 30	323,500	2-8-2	Yes	Yes	Walschaert	Crawford	Baldwin
	25	27 x 30	323,500	2-8-2	Yes	Yes	Walschaert	.....	Lima
Pennsylvania Steel Co	1	19 x 26	122,000	0-6-0	No	Yes	.....	.....	Baldwin
	2	19 x 26	122,000	0-6-0	No	Yes	.....	.....	Baldwin
Peytona Lumber Co	1	3-10 x 12	84,000	Shay	...	...	.....	.....	Lima
Philadelphia & Reading	5	25 x 28	273,600	4-6-2	Yes	No	Walschaert	.....	Company shops
	10	23 x 28	177,000	0-6-0	No	No	Walschaert	.....	Company shops
	20	24 x32	334,400	2-8-2	Yes	No	Walschaert	Street	Baldwin
	6	26 & 40 x 32	478,000	2-8-8-2	Yes	No	Walschaert	Street	Baldwin
Philadelphia, Bethlehem & New England	2	21 x 26	151,000	0-6-0	...	...	.....	.....	American
	2	22 x 28	198,000	0-8-0	...	...	.....	.....	American
Philadelphia Electric Co	1	16 x 24	98,500	0-4-0	No	Yes	.....	.....	Baldwin
Phoenix Logging Co	1	3-12 x 12	120,000	Shay	...	...	.....	.....	Lima
Pioneer Lumber Co	1	3-10 x 12	84,000	Shay	...	...	.....	.....	Lima
Pittsburgh & Lake Erie	10	.....	319,000	2-8-2	Yes	Yes	.....	.....	American

Purchaser	No.	Cylinders	Weight	Type	Super-heater	Brick arch	Valve gear	Automatic stoker	Builder
Pittsburgh Steel Company	1	21 x 26	176,500	0-6-0	No	No	Stephenson	.....	American
	1	14 x 22	80,000	0-4-0	No	No	Stephenson	.....	American
Puget Sound Mills & Timber Co	1	3-12 x 15	140,000	Shay	...	...	.....	.....	Lima
Pullman Co.	1	.....	.....	0-4-0	...	...	.....	.....	American
Quebec Central	2	20 x 26	164,000	4-6-0	Yes	No	Stephenson	.....	C. P. Ry.
Rapid City, Black Hills & Western	1	16 x 24	109,100	2-6-2	No	No	.....	.....	Baldwin
Raritan River	1	20 x 24	164,700	2-8-2	No	Yes	.....	.....	Baldwin
	1	20 x 26	172,000	4-6-2	No	Yes	.....	.....	Baldwin
Republic Iron & Steel Co	2	22 x 26	173,300	2-6-0	No	Yes	.....	.....	Baldwin
River Terminal Ry. Co	2	21 x 26	147,000	0-6-0	No	Yes	.....	.....	Baldwin
	2	21 x 26	148,000	0-6-0	Yes	Yes	.....	.....	Baldwin
	6	.....	.....	....	...	...	.....	.....	Baldwin
Roebling's, John A., Sons Co	1	.....	.....	Switch	...	...	.....	.....	Baldwin
Roscoe, Snyder & Pacific	1	18 x 24	126,000	4-6-0	Yes	No	.....	.....	Baldwin
St. Louis-San Francisco	10	26½ x 28	296,000	4-6-2	Yes	Yes	Baker	Street	Baldwin
	30	29 x 30	386,000	2-10-2	Yes	Yes	Walschaert	Street	Baldwin
	30	29 x 30	386,000	2-10-2	Yes	Yes	.....	.....	Baldwin
St. Louis Southwestern	8	22 x 28	209,500	4-6-0	Yes	Yes	Baker	.....	Baldwin
	12	25 x 30	234,000	2-8-0	Yes	Yes	Baker	.....	Baldwin
St. Paul & Tacoma Lumber Co	1	3-12 x 15	140,000	Shay	...	...	.....	.....	Lima
St. Paul Bridge & Terminal	1	20 x 26	154,000	2-6-0	...	...	.....	.....	American
	2	20 x 26	154,000	2-6-0	...	...	.....	.....	American
Sandy River & Rangeley Lakes	1	12 x 16	75,750	4-4-2	No	Yes	.....	.....	Baldwin
Seaboard Air Line	5	27 x 28	316,000	4-8-2	Yes	Yes	Walschaert	.....	American
Semet-Solvay Co.	2	14 x 22	76,000	0-4-0	No	No	.....	.....	American
Sessions Foundry Co., Inc	1	14 x 22	86,500	2-4-2	No	No	.....	.....	Baldwin
Sewell Valley	1	3-12 x 15	140,000	Shay	...	...	.....	.....	Lima
Shevlin-Hixon Co.	1	18 x 24	139,000	2-8-2	No	No	.....	.....	Baldwin
Sierra Ry. of California	1	18 x 22	118,850	2-8-0	Yes	No	.....	.....	Baldwin
Sioux City Terminal	1	19 x 24	117,000	0-6-0	...	...	.....	.....	American
Sligo Furnace Co	1	3-12 x 15	140,000	Shay	...	...	.....	.....	Lima
Sloss-Sheffield Steel & Iron Co	7	9 x 14	24,000	0-4-0	No	No	.....	.....	Baldwin
Smith, W. T., & Co	1	2-6 x 10	26,000	Shay	...	...	.....	.....	Lima
Smoot Lumber Co	1	3-8 x 10	56,000	Shay	...	...	.....	.....	Lima
Snoqualmie Falls Lumber Co	2	18 x 24	140,800	2-8-2	No	Yes	.....	.....	Baldwin
Solvay Process Co	3	21 x 26	156,000	0-6-0	Yes	Yes	Walschaert	.....	American
Sound Timber Co	1	3-12 x 15	140,000	Shay	...	...	.....	.....	Lima
Southern	30	28 x 32	370,000	2-10-2	Yes	Yes	Southern	Street	Baldwin
	15	27 x 28	315,500	4-8-2	Yes	Yes	Southern	.....	Baldwin
	25	28 x 32	370,000	2-10-2	Yes	Yes	Southern	Street	Baldwin
	8	27 x 28	315,500	4-8-2	Yes	Yes	Southern	.....	Baldwin
	12	25 & 39 x 30	400,000	2-8-8-2	Yes	Yes	Southern	Street	Baldwin
Southern Pacific Company	*10	10,000 gal. Semi-Cylindrical Tenders only							Lima
Southern Utah	1	.....	.....	"McKeen Mallet" motor car				.....	McKeen
Standard Car Construction Co	1	16 x 24	98,500	0-4-0	No	Yes	.....	.....	Baldwin
Standard Oil Co. (N. J.)	1	9 x 14	28,250	0-4-0	No	No	.....	.....	Baldwin
Standard Oil Co	1	9 x 14	28,250	0-4-0	No	No	.....	.....	Baldwin
	1	9 x 14	27,500	0-4-0	No	No	.....	.....	Baldwin
	1	21 x 26	154,000	0-6-0	...	...	.....	.....	American
Standard Steel Works Co	1	19 x 24	109,000	0-6-0	No	Yes	.....	.....	Baldwin
Sugarland Ry.	2	17 x 24	112,150	4-6-0	No	No	Walschaert	.....	Baldwin
Sumter Lumber Co	1	3-10 x 12	84,000	Shay	...	...	.....	.....	Lima
Sun Co.	1	19 x 24	124,000	0-6-0	No	Yes	.....	.....	Baldwin
Spice Run Lumber Co	1	3-12 x 15	140,000	Shay	...	...	.....	.....	Lima
Susquehanna & New York	1	23 x 28	211,500	2-8-0	Yes	Yes	Walschaert	.....	Baldwin
Temiskaming & Northern Ontario	5	25 x 30	258,900	2-8-2	Yes	Yes	Walschaert	.....	Canadian
	1	25 x 30	258,900	2-8-2	Yes	Yes	Young	.....	Canadian
Tennessee, Alabama & Georgia	2	18 x 26	139,800	4-6-0	No	Yes	Walschaert	.....	Baldwin
Terminal R. R. Association of St. Louis	11	22½ x 30	205,000	0-6-0	Yes	Yes	Baker	.....	American
	1	22½ x 30	205,000	0-6-0	Yes	Yes	Young	.....	American
Texas & Pacific	8	28 x 32	328,500	2-10-2	Yes	Yes	Southern	.....	Baldwin
Texas, Oklahoma & Eastern R. R. Co	1	16 x 24	115,000	2-6-2	Yes	Yes	Walschaert	.....	American
	1	16 x 24	110,000	2-6-2	Yes	Yes	Walschaert	.....	Baldwin
Tidewater Oil Co	1	19 x 24	127,700	0-6-0	No	No	.....	.....	Baldwin
Tuckerton	1	19 x 26	138,000	4-6-0	No	Yes	.....	.....	Baldwin
Tucson, Cornelia & Gila Bend	1	19 x 26	165,000	2-6-0	Yes	No	.....	.....	American
	1	19 x 26	165,000	2-6-0	...	No	.....	.....	American
Turkey Foot Lumber Co	1	3-12 x 15	140,000	Shay	...	...	.....	.....	Lima
Tuscarora Valley	1	13 x 18	60,600	4-4-0	No	Yes	.....	.....	Baldwin
Union	2	22 x 28	173,000	0-6-0	No	No	.....	.....	Baldwin
Union Cypress Co	1	16 x 24	104,000	4-6-0	No	No	.....	.....	Baldwin
Union Pacific System	16	29½ x 30	377,000	2-10-2	Yes	Yes	Walschaert	Street	Baldwin
	20	26 x 28	286,000	2-8-2	Yes	Yes	Walschaert	.....	Baldwin
	10	21 x 26	156,000	0-6-0	Yes	No	.....	.....	Baldwin
Union Pacific	3	.....	.....	2-8-8-0	...	...	.....	.....	Baldwin
U. S. Metals Refining Co	1	8 x 12	20,500	0-4-0	No	No	.....	.....	Baldwin
United Steel Co	1	17 x 24	120,000	0-6-0	...	...	.....	.....	Lima
	1	17 x 24	98,000	0-4-0	...	...	.....	.....	Lima
Verde Tunnel & Smelter	1	21 x 26	160,000	0-6-0	Yes	...	.....	.....	American
Virginian	1	34 & 34 & 34 x 32	844,000	2-8-8-8-2	Yes	Yes	Baker	Street	Baldwin
	10	.....	.....	2-10-10-0	...	...	.....	.....	American
Wabash	25	29 x 32	380,000	2-10-2	Yes	Yes	Walschaert	Duplex	American
Warren Lumber Co.	1	3-11 x 12	100,000	Shay	...	...	.....	.....	Lima
Wawa Commercial Co	1	2-7 x 12	36,000	Shay	...	...	.....	.....	Lima
Wayne County Commissioners	1	2-6 x 10	26,000	Shay	...	...	.....	.....	Lima
	1	2-6 x 10	26,000	Shay	...	...	.....	.....	Lima
Wessel, Duval Co	3	3-8 x 12	64,000	Shay	...	...	.....	.....	Lima
West End Coal Co	1	18 x 24	163,500	2-6-2	No	No	.....	.....	Baldwin
West Lumber Co	1	16 x 24	100,700	2-6-2	No	Yes	.....	.....	Baldwin
West Penn Power Co	1	20 x 26	148,000	0-6-0	No	Yes	.....	.....	Baldwin
West Virginia Northern	1	21 x 24	152,000	2-8-0	No	No	.....	.....	Baldwin
Western Cooperage Co	1	3-11 x 12	100,000	Shay	...	...	.....	.....	Lima
Western Maryland	10	26 & 40 x 30	495,000	2-8-8-2	Yes	Yes	Baker	Duplex	Lima
Western Pacific	5	23½ & 37 x 32	429,000	2-6-6-2	Yes	Yes	Walschaert	.....	American
Westinghouse Elect. & Mfg. Co	1	19 x 24	119,000	0-6-0	No	Yes	.....	.....	Baldwin
Westinghouse Machine Co	1	18 x 24	103,000	0-4-0	No	Yes	.....	.....	Baldwin
Wheeling & Lake Erie	10	25½ & 39 x 32	435,000	2-6-6-2	Yes	Yes	Baker	Street	American
	10	25½ & 39 x 32	435,000	2-6-6-2	Yes	Yes	Baker	Duplex	American
Wheeling Steel & Iron Co	1	19 x 24	131,000	0-6-0	No	Yes	.....	.....	Baldwin
Whitaker-Glessner Co	2	17 x 24	88,000	0-6-0	...	...	.....	.....	Lima
Wilderness Lumber Co	1	3-10 x 10	72,000	Shay	...	...	.....	.....	Lima
Wilwin Co., Ltd	1	12 x 18	55,400	2-4-2	No	No	.....	.....	Baldwin
Wood, Alan, Iron & Steel Co	1	9 x 14	24,000	0-4-0	No	No	.....	.....	Baldwin
Worth Bros. Co	2	22 x 26	159,000	0-6-0	No	No	.....	.....	Baldwin
	2	14 x 16	58,000	0-4-0	No	No	.....	.....	Baldwin
	1	22 x 26	160,000	0-6-0	No	No	.....	.....	Baldwin
Yawkee-Bissell Lumber Co	1	3-10 x 12	84,000	Shay	...	...	.....	.....	Lima
Yellow Pine Mining Co	1	2-8 x 12	40,000	Shay	...	...	.....	.....	Lima
Yosemite Valley	1	19 x 28	143,000	2-6-0	No	No	.....	.....	Baldwin
Youngstown Sheet & Tube Co	2	17 x 20	109,000	0-4-0	No	No	.....	.....	Baldwin

ORDERS FROM FOREIGN RAILWAYS

Purchaser	No.	Cylinders	Weight	Type	Super-heater	Brick arch	Valve gear	Automatic stoker	Builder
Allain, Maurice (Brazil)	1	9 x 14	.....	2-4-0	No	No	.....	.....	Baldwin
Alto Cedro Sugar Co. (Cuba)	1	12 x 18	51,000	0-4-0	...	...	.....	.....	American
Amsinck, G., & Co., Inc. (Peru)	1	9 x 14	24,000	0-6-0	No	No	.....	.....	Baldwin
Anaconda Copper Mining Co. (for Chile)	1	17 x 22	.....	2-6-2	Yes	No	.....	.....	Baldwin
	1	16 & 25 x 20	.....	2-6-6-2	Yes	No	.....	.....	Baldwin
	1	17 x 22	.....	2-8-0	Yes	No	.....	.....	Baldwin
Balfour, Williamson & Co. (Chile)	1	12 x 16	.....	0-4-0	No	No	.....	.....	Baldwin
Banes R. R. (Cuba)	1	16 x 20	72,800	2-8-0	No	Yes	.....	.....	Baldwin
Benitez Sugar Co. (Porto Rico)	1	9 x 14	26,000	2-4-0	No	No	.....	.....	Baldwin
Borneo Co.	2	10 x 16	36,000	0-6-0	Yes	...	.....	.....	American
Braden Copper Co. (Chile)	3	3-10 x 12	84,000	Shay	...	...	.....	.....	Lima
	2	3-11 x 12	120,000	Shay	...	...	.....	.....	Lima
	2	11 x 16	39,000	0-4-0	...	...	.....	.....	American
British Government	20	14 x 22	76,000	0-4-0	No	No	.....	.....	Baldwin
	40	.....	.....	2-8-0	...	...	.....	.....	Canadian
	100	9 x 14	36,000	2-6-2	...	...	.....	.....	American
British War Office	45	9 x 12	32,800	4-6-0	No	No	.....	.....	Baldwin
	350	9 x 12	32,800	4-6-0	No	No	.....	.....	Baldwin
	100	9 x 12	32,800	4-6-0	No	No	.....	.....	Baldwin
	50	14 x 22	78,000	0-4-0	No	No	.....	.....	Baldwin
C. de F. de Lourenco Marques (Africa)	3	21½ x 24	186,000	2-10-2	Yes	Yes	.....	.....	Baldwin
C. de F. de Madagascar	4	280 & 425 x 500 mm.	70,500	0-4-4-0	No	No	.....	.....	Baldwin
	2	280 & 425 x 500 mm.	70,500	0-4-4-0	No	No	.....	.....	Baldwin
Canton-Hankow Ry. (China)	2	17 x24	100,800	0-6-0	No	No	.....	.....	Baldwin
	4	21 x 26	159,000	4-6-0	Yes	No	.....	.....	Baldwin
	4	22 x 26	160,100	2-8-0	Yes	No	.....	.....	Baldwin
Carbones De La Nueva	1	7 x 12	17,000	0-4-0	...	...	.....	.....	American
Carmichael, R. S., & Co. (France)	1	Gasolene	18,000	0-4-0	...	...	.....	.....	Baldwin
Carrillo & Co. (Ecuador)	1	8 x 12	16,500	0-6-0	No	No	.....	.....	Baldwin
Cayey Sugar Co. (Porto Rico)	1	Gasolene	7,000	0-4-0	...	...	.....	.....	Baldwin
Central Australia (Cuba)	1	17 x 20	88,000	2-6-0	No	Yes	.....	.....	Baldwin
Central Azucarero del Zulia (Venezuela)	2	9 x 14	28,000	2-4-0	No	No	.....	.....	Baldwin
Central Cabaiguan (Cuba)	1	17 x 24	98,500	2-6-0	No	Yes	.....	.....	Baldwin
Central Cambalache	2	2-6 x 10	26,000	Shay	...	...	.....	.....	Lima
Central Cunagua (Cuba)	3	18 x 24	.....	4-6-0	Yes	...	.....	.....	Baldwin
Central Ceiba (Venezuela)	1	7 x 12	16,000	0-4-0	No	No	.....	.....	Baldwin
Central Confluente (Cuba)	1	12 x 16	48,000	2-8-0	No	No	.....	.....	Baldwin
Central Eureka, Inc. (Porto Rico)	1	5 x 10	9,700	0-4-0	No	No	.....	.....	Baldwin
Central Fe (Cuba)	1	13 x 18	61,000	0-6-2	No	No	.....	.....	Baldwin
Central Los Canos (Porto Rico)	1	5 x 10	95,000	0-4-0	No	No	.....	.....	Baldwin
Central Loteria (Cuba)	1	12 x 16	45,000	2-6-0	No	Yes	.....	.....	Baldwin
Central Moron Sugar Co. (Cuba)	1	18 x 22	122,000	2-8-0	No	No	.....	.....	Baldwin
Central Narcissa (Cuba)	1	16 x 20	94,000	2-8-0	No	Yes	.....	.....	Baldwin
Central of Brazil	2	18 x 22	117,000	2-8-0	No	No	.....	.....	Baldwin
	2	21½ x 28	207,000	4-6-2	Yes	...	.....	.....	American
	12	21½ x 28	175,000	4-6-0	Yes	...	.....	.....	American
	15	21½ x 26	163,000	2-8-0	Yes	...	.....	.....	American
	3	20 & 32 x 26	280,000	0-8-8-0	Yes	...	.....	.....	American
Central Palma (Cuba)	1	14 x 24	76,000	2-4-0	No	No	.....	.....	Baldwin
	1	16 x 24	94,000	2-6-0	Yes	Yes	.....	.....	Baldwin
Central Porfuerza (Cuba)	1	20 x 24	133,200	2-8-0	Yes	Yes	.....	.....	Baldwin
Central Providencia (Cuba)	1	12 x 16	39,000	2-6-0	No	Yes	.....	.....	Baldwin
Central Refroma (Cuba)	1	18 x 24	111,000	2-6-0	No	Yes	.....	.....	Baldwin
Central Rosa Maria (Cuba)	1	9 x 16	34,000	0-6-2	No	No	.....	.....	Baldwin
Central San Agustin (Cuba)	1	17 x 24	102,000	2-8-0	No	Yes	.....	.....	Baldwin
	1	14 x 20	73,000	2-8-0	No	No	.....	.....	Baldwin
Central San Antonio (Cuba)	1	12 x 18	46,000	2-6-0	No	No	.....	.....	Baldwin
Central San Jose (Cuba)	1	15 x 20	80,000	2-8-0	No	No	.....	.....	Baldwin
	1	15 x 20	.....	2-8-0	No	...	.....	.....	Baldwin
Central San Lino (Cuba)	1	14 x 20	69,000	2-8-0	No	Yes	.....	.....	Baldwin
Central San Ramon (Cuba)	1	9 x 14	36,000	2-4-2	No	No	.....	.....	Baldwin
Central Soledad (Cuba)	2	12 x 18	46,000	2-6-0	No	No	.....	.....	Baldwin
Central Union (Cuba)	1	13 x 20	84,000	2-4-4	No	Yes	.....	.....	Baldwin
	1	19 x 24	123,000	2-6-0	No	Yes	.....	.....	Baldwin
Cerro de Pasco	2	21 x 28	160,000	2-8-0	...	...	.....	.....	American
Chaparra Sugar Co. (Cuba)	2	15 x 20	74,000	2-6-0	No	Yes	.....	.....	Baldwin
Chile Exploration Co.	1	18 x 24	.....	2-6-2	No	No	.....	.....	Baldwin
Cie Francaise des Metaux de St. Denis (France)	1	8 x 14	26,000	0-4-0	No	No	.....	.....	Baldwin
	1	11 x 16	.....	0-6-0	No	...	.....	.....	Baldwin
Coates & Tweed	4	19 x 26	111,000	0-6-0	...	...	.....	.....	American
Colombian Northern Ry.	1	14 x 18	74,000	2-8-0	Yes	Yes	.....	.....	Baldwin
Compagnia Espana Colonisation	6	.....	105,000	4-6-0	Yes	...	.....	.....	American
Compania Gen. de Asfaltos y Cementos Asland	1	9 x 14	35,000	0-6-0	...	...	.....	.....	American
Consuelo Estate (San Dom.)	2	12 x 16	45,500	2-6-0	Yes	No	.....	.....	Baldwin
Cuba Company	3	18 x 24	112,000	0-6-0	...	...	.....	.....	American
Cuba R. R.	25	20 x 26	152,000	4-6-0	Yes	...	.....	.....	American
Cuban-American Sugar Co	1	3-8 x 10	56,000	Shay	...	...	.....	.....	Lima
Cuban Central	7	18 x 24	126,000	2-8-0	Yes	...	.....	.....	American
Cupey Sugar Co. (Cuba)	1	18 x 24	110,000	2-6-0	No	Yes	.....	.....	Baldwin
Darjeeling Himalayan Ry. (India)	3	11 x 14	.....	0-4-0	No	...	.....	.....	Baldwin
Dederich, Wm., Co. (for Belgian Congo)	24	.....	.....	....	...	...	.....	.....	Porter
Dorn & Co., R. J.	1	.....	21,000	0-6-0	...	...	.....	.....	American
Egyptian State Rys.	24	10 x 14	35,000	0-6-0	...	...	.....	.....	American
F. C. Cantabrico (Spain)	2	16 x 20	111,000	2-8-2	No	Yes	.....	.....	Baldwin
F. C. de la Robla (Spain)	2	17 x 22	.....	2-8-0	No	Yes	.....	.....	Baldwin
F. C. del Norte de Cuba	4	19 x 26	137,000	4-6-0	Yes	Yes	.....	.....	Baldwin
Ferrocarril Central Dominicano	1	3-10 x 12	84,000	Shay	...	...	.....	.....	Lima
Finland State Rys.	20	20 x 28	138,000	2-8-0	Yes	...	.....	.....	American
Francisco Sugar Co (Cuba)	1	17 x 24	100,000	2-8-0	No	No	.....	.....	Baldwin
France, Republic of	12	9 x 12	29,000	0-6-0	No	No	.....	.....	Baldwin
	100	175 x 240 mm.	12,790 k.	Pechot	No	No	.....	.....	Baldwin
French Government	80	175 x 240 mm.	12,790 k.	Pechot	No	No	.....	.....	Baldwin
	50	13 x 16	60,000	0-6-2	No	No	.....	.....	Baldwin
French Government (for Morocco)	5	9 x 12	35,000	4-6-0	No	No	.....	.....	Baldwin
French State Railways	100	23 x 26	161,000	2-8-0	...	...	.....	.....	American
French War Office	4	15 x 16	44,000	0-4-0	(Fireless)		.....	.....	Baldwin
	3	15 x 16	44,000	0-4-0	(Fireless)		.....	.....	Baldwin
	1	15 x 16	44,000	0-4-0	(Fireless)		.....	.....	Baldwin
Fuji Minobu Ry. (Japan)	2	15 x 20	.....	2-6-2	No	...	.....	.....	Baldwin
Grace, W. R., & Co.	2	11 x 16	41,000	0-4-0	...	...	.....	.....	American
Grace, W. R., & Co. (for Chile)	1	11 x 16	.....	0-4-2	No	No	.....	.....	Baldwin
Guanica Centrale (Porto Rico)	1	14 x 20	64,000	0-6-0	...	...	.....	.....	American
Guanica Centrale (Santo Domingo)	1	14 x 22	80,000	2-6-0	No	Yes	.....	.....	Baldwin
	2	14 x 22	80,000	2-6-0	No	Yes	.....	.....	Baldwin
	2	14 x 22	80,000	2-6-0	No	Yes	.....	.....	Baldwin
Guantanamo & Western (Cuba)	3	20 x 24	136,000	2-8-0	Yes	Yes	.....	.....	Baldwin
Hagemeyer & Brunn (Africa)	2	15 x 20	.....	4-6-2	No	...	.....	.....	Baldwin
Handelsvereeniging "Amsterdam" (Java)	3	10 x 14	34,000	0-8-0	No	No	.....	.....	Baldwin
Havana Central R. R. (Cuba)	2	12 x 18	50,000	2-8-0	No	No	.....	.....	Baldwin
Hermstoltz Co. (Brazil)	2	10 x 16	37,000	0-4-0	...	...	.....	.....	American
	1	11 x 16	39,000	0-4-0	...	...	.....	.....	American
Hershey Cuban R. R. (Cuba)	1	17 x 20	89,900	2-6-0	No	Yes	.....	.....	Baldwin
Honolulu Sugar Co. (Hawaii)	1	11 x 16	45,000	0-6-2	No	No	.....	.....	Baldwin

Purchaser	No.	Cylinders	Weight	Type	Superheater	Brick arch	Valve gear	Automatic stoker	Builder
Hormiguero Central Corp. (Cuba)	1	13 x 12	29,000	0-4-0	(Fireless)		.....	.....	Baldwin
Hutchinson Sugar Plantation Co. (Hawaii)	1	8 x 12	.....	0-4-2	No	No	.....	.....	Baldwin
Intl. Eng. & Trading Co. (Russia)	2	7 x 12	17,600	0-4-0	No	No	.....	.....	Baldwin
Italian State Rys.	40	21¼ x 27½	147,000	2-8-0	Yes	...	.....	.....	American
	60	21¼ x 27½	146,000	2-8-0	Yes	...	.....	.....	American
Java State Rys.	8	17½ & 28 x 24	200,500	2-8-8-0	Yes	...	.....	.....	American
Kaeleku Sugar Co. (Hawaii)	1	7 x 10	18,000	0-4-2	No	No	.....	.....	Baldwin
Kamakua Mill Co. (Hawaii)	1	10 x 16	37,000	0-6-2	No	No	.....	.....	Baldwin
Krajewski Pesant Corp. of Cuba	1	14 x 22	70,000	2-6-0	...	...	.....	.....	American
Lautaro Nitrate Co., Ltd. (Chile)	1	11 x 14	38,000	0-8-0	No	No	.....	.....	Baldwin
Manati Sugar Co. (Cuba)	4	16 x 20	90,000	2-8-0	No	No	.....	.....	Baldwin
	1	14½ & 22 x 20	139,000	2-6-6-2	No	No	.....	.....	Baldwin
Maui Agricultural Co. (Hawaii)	1	14 x 18	56,000	2-6-0	No	No	.....	.....	Baldwin
Mayari R. R. (Cuba)	3	22 x 28	.....	2-8-2	No	Yes	.....	.....	Baldwin
Mexican Petroleum Corp.	1	Gasolene	44,000	0-4-0	...	...	.....	.....	Baldwin
Minas y F. C. de Utrillas (Spain)	2	16 & 25 x 22	.....	0-6-6-0	No	...	.....	.....	Baldwin
Mogyana Ry. (Brazil)	3	17½ x 20	118,000	4-6-2	Yes	...	.....	.....	American
Mosle Bros. (Cuba)	1	20 x24	133,200	2-8-0	Yes	Yes	.....	.....	Baldwin
Nesttun-Osbanen (Norway)	1	11 x 12	.....	0-8-0	No	...	.....	.....	Baldwin
Nippon Seikosho Ry.	1	13 x 18	58,000	0-4-0	...	...	.....	.....	American
Northern Ry. of Spain	15	.....	194,000	2-8-2	Yes	...	.....	.....	American
Norwegian Hydro Co.	1	14.17 x 19.69	79,300	0-6-0	No	Yes	.....	.....	Baldwin
	1	22.05 x 23.62	142,380	2-8-2	Yes	Yes	.....	.....	Baldwin
Norwegian State Rys.	5	14.17 x 19.69	79,300	0-6-0	No	Yes	.....	.....	Baldwin
	5	20.66 x 23.62	142,380	2-6-2	Yes	Yes	.....	.....	Baldwin
	2	20 x 24	143,300	0-10-0	Yes	Yes	.....	.....	Baldwin
	1	22.5 x 25.2	145,500	2-8-0	Yes	Yes	.....	.....	Baldwin
	1	14.76 x 18.11	52,400	2-6-0	Yes	Yes	.....	.....	Baldwin
	3	22.05 x 23.62	149,800	2-8-2	Yes	Yes	.....	.....	Baldwin
Norwegian Trunk R. R.	2	20.66 x 23.62	142,380	2-6-2	Yes	Yes	.....	.....	Baldwin
	1	23 x 25.2	189,500	2-8-2	Yes	Yes	.....	.....	Baldwin
Oahu Sugar Co., Ltd. (Hawaii)	1	12 x 16	55,000	0-6-2	No	No	.....	.....	Baldwin
Orleans Ry. (France)	50	597 x 711 mm	200,000	2-8-2	Yes	...	.....	.....	American
Oving, H. E., Jr. (Java)	1	10 x 14	34,000	0-8-0	No	No	.....	.....	Baldwin
	1	8½ x 12	26,400	0-8-0	No	No	.....	.....	Baldwin
	1	10 x 14	34,000	0-8-0	No	No	.....	.....	Baldwin
	1	10 x 14	34,000	0-8-0	No	No	.....	.....	Baldwin
Paris, Lyons & Mediterranean (France)	140	20 1/16 x 25 9/16	210,000	2-8-2	Yes	Yes	.....	.....	Baldwin
	...	28⅜ x 27 9/16	.....	....	...	...	.....	.....	Baldwin
Paris-Orleans Ry. (France)	50	23½ x 28	200,000	2-8-2	...	...	.....	.....	American
Paulista Ry. (Brazil)	4	23 x 26	220,000	4-6-2	Yes	...	.....	.....	American
Pekin-Hankow Ry. (China)	10	22 x 26	166,000	2-8-0	Yes	...	.....	.....	American
Pekin-Kalgan Ry. (China)	4	20 x 28	186,000	2-8-2	Yes	...	.....	.....	American
Peking-Mukden Ry. (China)	2	.....	.....	2-8-2	...	...	.....	.....	Baldwin
Plazuela Sugar Co.	1	3-10 x 10	72,000	Shay	...	...	.....	.....	Lima
Porcella, Vicini & Co., Inc. (San Dom.)	2	8 x 14	23,000	2-6-0	No	No	.....	.....	Baldwin
	1	10 x 16	36,600	2-6-0	No	No	.....	.....	Baldwin
	1	.....	.....	2-4-0	...	...	.....	.....	Baldwin
Putiloff Works (Russia)	12	10½ x 16	28,500	0-4-0	No	No	.....	.....	Baldwin
Quelimane Ry. (Port. Ea. Africa)	1	11 x 16	38,000	2-6-0	...	...	.....	.....	American
	1	13 x 18	53,000	2-6-0	...	...	.....	.....	American
	2	13 x 18	53,000	2-6-0	...	...	.....	.....	American
	1	13 x 18	53,000	2-6-0	...	...	.....	.....	American
Quisqueya Plantation (Santo Domingo)	1	11 x 16	35,800	2-4-0	No	No	.....	.....	Baldwin
	1	11 x 16	35,800	2-4-0	No	No	.....	.....	Baldwin
Ramirez, Domingo (Cuba)	1	10 x 16	31,200	2-4-0	No	No	.....	.....	Baldwin
Rhodesia Rys.	6	23 x 24	172,000	4-8-2	...	...	.....	.....	American
Rio Cauto Sugar Co., Inc. (Cuba)	1	14 x 20	62,000	2-6-0	No	No	.....	.....	Baldwin
Rosco Trading Co., Inc. (Ecuador)	1	5 x 10	10,000	0-4-0	No	No	.....	.....	Baldwin
Russian Government	350	.....	14,000	Gasoline	...	...	.....	.....	Baldwin
	9	11 x 16	37,000	2-6-0	...	...	.....	.....	American
	40	25 x 28	197,000	2-10-0	Yes	Yes	.....	.....	American
	110	25 x 28	202,000	2-10-0	Yes	Yes	.....	.....	American
	41	25 x 28	192,000	2-10-0	Yes	Yes	.....	.....	Canadian
	9	.....	.....	2-10-0	Yes	Yes	.....	.....	Canadian
	350	Gasolene	14,000	0-6-0	...	...	.....	.....	Baldwin
	6	25 x 28	197,000	2-10-0	Yes	Yes	.....	.....	American
	70	.....	45,000	0-6-0	...	...	.....	.....	American
	150	25 x 28	.....	2-10-0	Yes	Yes	.....	.....	Baldwin
San Carlos Milling Co., Ltd. (Philippines)	1	9 x 16	27,000	0-6-0	No	No	.....	.....	Baldwin
San Jose Sugar Co. (San Dom.)	1	10 x 16	32,000	2-6-0	No	No	.....	.....	Baldwin
	1	11 x 16	.....	2-6-0	No	...	.....	.....	Baldwin
Santa Fe Plantation & Sugar Co. (San Dom.)	1	14 x 18	68,000	2-8-0	Yes	No	.....	.....	Baldwin
	1	15 x 18	.....	2-8-0	Yes	...	.....	.....	Baldwin
Shantung Ry. (China)	3	20½ x 26	158,000	2-8-0	Yes	...	.....	.....	American
Sociedad Agricola Pucala, Ltd. (Peru)	1	9 x 12	24,000	0-6-0	No	No	.....	.....	Baldwin
Societe Anonyme des Plantations de Gounoung	1	7 x 12	23,000	0-6-0	...	...	.....	.....	American
Societe de Penarroya (Spain)	1	19 x 22	158,000	2-8-2	No	Yes	.....	.....	Baldwin
Tacajo Sugar Corp. (Cuba)	2	15 x 18	72,000	2-6-0	No	Yes	.....	.....	Baldwin
Tata Iron & Steel Co. (India)	5	18 x 24	109,000	0-6-0	...	...	.....	.....	American
Togoland Military Ry.	2	15 x 20	96,000	2-8-2	...	...	.....	.....	American
Union Miniere du Haut-Katanga	8	10 x 16	45,000	0-6-0	...	...	.....	.....	American
	5	15 x 20	100,000	2-6-2	...	...	.....	.....	American
	4	7 x 12	18,000	0-4-0	No	No	.....	.....	Baldwin
United Rys. of Havana	3	20 x 26	159,000	2-8-0	Yes	...	.....	.....	American
	3	19 x 24	128,000	0-6-0	...	...	.....	.....	American
United Railways of Yucatan	2	15 x 20	73,000	4-6-0	No	No	.....	.....	Baldwin
Usina Sao Carlos (Brazil)	1	10 x 16	.....	0-4-2	No	No	.....	.....	Baldwin
Waiakea Mill Co. (Hawaii)	1	9 x 14	32,000	0-4-2	No	No	.....	.....	Baldwin
West India Management & Consultation Co.	1	12 x 18	50,000	2-6-0	...	...	.....	.....	American

MURMAN, THE NEW RUSSIAN ARCTIC PORT.—The British Board of Trade has been notified through the Foreign Office that a new town and ice-free port at the terminus of the Murman Railway, to be known as Murman, has been established by imperial proclamation. This town will be about five degrees west of Archangel and will save a sea haul for ocean vessels of about 700 miles, and, on account of its location on the northwestern portion of the Murman coast it comes within the sweep of the Gulf Stream and has free water the year round. The Murman Railway was projected several years ago, but received an impetus as a result of the war. A year ago 700 Canadian engineers were sent to Russia to work on its construction. The territory served is through valuable timber country. It is the district bordering the Arctic between Norway and the White sea known as the Murman district. The main points touched are Murman, Kola Alexandrowska, Kandalascha, Kanda, Kem and the west coast of Lake Onega and terminates at Petrograd. This will considerably reduce the rail haul from the Arctic terminal ports to Petrograd. Burman, 7 miles to the north of Kola, has temporary wooden quays for three large vessels, with 25-ton cranes. The harbor is roomy and well protected. More than forty large vessels can anchor at the same time. The Murman Railway is divided into five sections—Petrograd-Zwanka, 76 miles; Zwanka-Petrosavodsk, 171 miles; Petrosavodsk-Kem, 272 miles; Kem-Kandalascha, 215 miles, and Kandalascha-Murman, 177 miles. The Kem-Kandalascha section is the only one that has not yet reached completion.

THE TRANSPORTATION OF AMERICAN TROOPS IN 1916

During 1916, the largest movement of troops took place since the Spanish-American war. In his annual report the Quartermaster General of the U. S. Army makes the following statement: "Considering the great distances traveled by the militia from the various camps to the Mexican border, the fact that there was but a single accident, and that of a minor character, the celerity with which the trains were moved and the entire absence of congestion or delay, it is believed that there has been no case in history where troops have been as well and as safely transported or as well cared for while en route as in the recent mobilization."

The movement began early in the year when several regular army detachments of cavalry, infantry, artillery and engineers were sent to the border on March 11, March 20, May 9 and June 11. The transportation of these organizations was accomplished in an excellent manner, in exceptionally good time, and without accidents of any nature. On May 9, the militia of Arizona, New Mexico and Texas were called to the border, and on June 18, 1916, the national guard troops of all the other states were called into the service of the United States and directed to assemble at their state mobilization camps. From these points to designated stations on the frontier transportation arrangements were under the direction of the War Department. The troops began leaving their mobilization camps about midnight on June 26. On July 1, there were en route to the border from various sections of the United States 122 troop trains, carrying over 2,000 freight, passenger and baggage cars, with a total strength of 36,042 men. On July 4, 101 troop trains were en route and 52,681 militia troops (not including Arizona, New Mexico and Texas) were either at the border or on the way thereto. From the beginning of the movement up to July 31, 111,919 militia troops were moved to the international boundary.

Some idea of the task imposed upon the railroads of the country by the transportation of the national guard may be had when it is considered that 350 trains were necessary to carry the first 100,000 troops. Over 3,000 passenger cars, including standard Pullman and tourist cars and coaches, were provided, and in addition about 400 baggage cars, most of which were equipped as kitchen cars for serving hot meals en route, 1,300 box cars, 2,000 stock cars, 800 flat cars and approximately 4,900 locomotives and crews, not including switching engines, yard engines and their crews. The call upon the railroads for the transportation of the militia occurred in the fortnight which includes the Fourth of July, the time of the greatest density of passenger travel in the eastern states. Instructions were issued by all railroads concerned that the movement of troop trains was to be given preference over other travel, and it is believed that this was done in all cases.

To have effected the entire movement of all the troops in tourist sleepers would have required approximately 3,000 cars, or five times as many as were in existence. The Pullman Company, by utilizing some standard sleeping cars, made available for the movement 623 tourist cars. In all cases where it was possible to do so tourist equipment was furnished, and where they were not immediately available the troops were met en route and transferred to tourists in every possible case. Official reports from all military departments show that no organization moved in coaches in less space than three men to every four seats and wherever possible two seats for each man. The total number of men transported in coaches averaged 30 men to each coach.

Although the movement of organized militia came at a time when the commercial traffic on the railroads was the largest in years, it was accomplished with very little interference with regular train service and with no congestion whatever, either at initial or terminal points or en route. In July, there were moved into the Brownsville (Tex.) district 106 special trains, composed of 1,216 cars of passengers and 1,201 cars of freight for the army, in addition to 680 cars of army supplies, handled in freight trains and the usual commercial traffic. This district is reached only by one single-track line, and all rolling stock had to be returned over the same line.

The concentration of the militia on the Mexican border and the mobilization for the great war in 1914 are not comparable, as all civil traffic was suspended in Europe to make way for military movements and the distances involved in the movement to the Mexican border were very much greater than those in Europe. The longest run in Germany was about 700 miles and in France much less, whereas the distances traveled by the troops in the United States varied from 608 miles, in the case of Louisiana troops, to 2,916 miles in the case of Connecticut troops. The majority of the troops came from northern and northeastern states and were carried over 2,000 miles, in most cases in remarkably fast time. For example, the Seventh New York Infantry with 1,400 men, equipment, ammunition and baggage left New York at 2 p. m. on June 27, and arrived at San Antonio, Tex., at 8:30 p. m., on June 30, a distance of 2,087 miles. Shipments of freight were made from Washington and vicinity to the border in four days, from New York and vicinity in five days, and from the Great Lakes in a little more than 48 hours.

As a specific example showing how the co-operation of the railroad companies assisted the army, there may be cited the case of the first motor trucks purchased for the expeditionary forces in Mexico. Twenty-seven trucks were purchased under bid in Wisconsin on March 14. They were inspected and loaded in 14 cars; the men to operate them were employed and tourist cars furnished for them, following which a train was made up which left Wisconsin at 3:11 a. m. on March 16. It arrived at Columbus, N. M., 1,591 miles away, shortly after noon on the 18th; the trucks were unloaded from the cars, loaded with supplies, and sent across the border, reaching General Pershing's command with adequate supplies of food before he had exhausted the supplies taken with him from Columbus.

A special committee on co-operation with the military authorities which was established by the American Railway Association at the request of the War Department in October, 1915, took charge of the movement of troops and freight under the orders of the quartermaster general. All matters directly affecting the operation of trains were in the hands of this committee. Freight cars carrying army supplies were appropriately placarded, were sent in the fastest moving trains, immediately delivered, and at once identified and released, without the necessity of waiting for formal bills of lading and official papers of the railways and the government. The placards, which bore the legend "United States Army" at the head, followed by the car initial, car number, point of shipment, contents, consignee, destination, routing, date shipped and consignor, served as full identification for all shipments.

FRENCH RAILWAY SPEED IN WINTER.—We give in tabular form below the fastest schedule times for the winter services on French railways. Under the circumstances that prevail the services are, it will be readily admitted, highly creditable. As far as we can learn, the booked speeds are very fairly adhered to in practice.

Company.		Distance in miles.	Speed, m.p.h.
Nord	Amiens—Paris	81.3	52.57
P.L.M.	Les Arcs—St. Raphael	16.1	52.1
P.O.	Nantes—Angers	54.0	49.05
Midi	Narbonne—Perpignan	39.7	47.6
Est	Longueville—Romilly	24.8	45.14
Etat	Rouen—Le Havre	54.6	43.1

—The Engineer, London.

General News Department

The Chicago, Milwaukee & St. Paul passenger station and hotel at La Crosse, Wis., was destroyed by fire on the night of Dec. 24; estimated loss $40,000.

On the Buffalo, Rochester & Pittsburgh extra-gang foremen in charge of track gangs composed of 10 men or more are to carry a whistle for the purpose of sounding a warning to the men to step clear of the tracks when trains are approaching.

The bonuses recently granted by the Erie Railroad, according to advices from an officer of the company, go only to clerks (those who receive $100 or less a month), who have been in the service continuously since January 1, 1915, in the general offices at New York, Jersey City, Buffalo, Youngstown, Cleveland and Chicago.

Senator Poindexter, on December 20, introduced in the Senate a bill, Section 7504, to amend Section 4 of the act to regulate commerce by striking out the provision giving the Interstate Commerce Commission authority to grant relief to common carriers from the operation of a strict observance of the long and short haul rule.

Operator Walsh of the Marconi Wireless telegraph office at Honolulu, Hawaii, recently sent 67 messages to the receiving station in California in one hour, twenty minutes. The distance is 2,372 miles. The shortest message was one of 15 words. Operator Barsby, at the receiving station, copied these messages without a break or an error.

The Gulf, Sabine & Red River Railroad, which runs between Orange, Tex., and Francis, La., and which originally was built for a logging railroad, will be opened on January 1 for regular freight and passenger traffic. The line is about one hundred miles long. It was recently extended and now accommodates a large area of country of southwestern Louisiana and southeastern Texas.

The President has nominated W. M. Daniels for reappointment as a member of the Interstate Commerce Commission, but the Senate had not confirmed the appointment when it adjourned for the holidays. Mr. Daniels' term expires December 31, but his confirmation was opposed in executive sessions of the Senate on December 20, 21 and 22 by a filibuster on the part of the Progressives who opposed his original appointment.

The latest complainer concerning the confiscation of coal in transportation is a railroad company. According to a press despatch from Ft. Worth, Tex., the Kansas City, Mexico & Orient is still looking for 30 carloads of coal, which have been taken for the use of the locomotives of the road which carries the coal from the mines at Thurber to the nearest point on the Orient line. The Orient has been obliged to take off some trains.

The Wells Fargo Express made a Christmas gift of $1,000,000 to its employees. Men and women who have been in its exclusive employ for a year or more and who draw a salary of $2,000 a year or less, will receive a bonus equal to one month's wages, to be distributed in quarterly instalments on the first of January, April, July and October, 1917. Such employees who have not been in the company's service for a full year on January 1, will become eligible for participation in all payments following their attainment of a year's service. Approximately 8,000 employees will be affected.

The Manhattan & Queens Traction Corporation, a street car line operating in Manhattan and Queens boroughs, New York City, has presented two hundred of its employees with life insurance policies for $500 each. The only condition imposed is that the beneficiaries shall join the Mutual Benefit Association, which substantially all of them have done already. The policies are made out on the one-year renewable term plan. They are in the Travelers Insurance Company of Hartford, Conn., the company which made a somewhat similar arrangement with the Brooklyn Rapid Transit Company a year ago for the benefit of several thousand employees of that company.

The four new spans of the Union Pacific bridge at Omaha were rolled from erected position alongside to final place on the piers on Saturday, December 23, after the old spans had been shifted onto falsework on the opposite side. To accomplish the change in the shortest time, both old and new superstructures were each moved as a unit having a total length of 1,000 ft. In the case of the new spans the total weight moved was 3,850 tons. The operation was entirely successful, all steps being carried out exactly as planned. It was necessary to resort to this method in order to cause a minimum interference with the heavy traffic over the bridge, which is used by most of the trains of the lines connecting with the Union Pacific at Omaha. While the change was in progress trains were detoured over the Illinois Central bridge, and over the Burlington bridge at Plattsmouth. The new spans provide for double track, and replace spans on the same substructure erected in 1887 by Geo. S. Morison, a builder of many notable railway bridges. The new approaches require some changes in the substructure, and will not be completed until next spring.

Proposed Legislation Affecting Railways

Senator Newlands has introduced a bill, Section 7555, at the request of the National Association of Railway Commissioners, to amend Section 15 of the commerce act to give the Interstate Commerce Commission authority to regulate matters pertaining to car interchange.

Accident Record—Correction

An officer of the Pennsylvania writes that there is no record of a train accident at Munhall, Pa., on the 7th of November, as stated in connection with the report of train accidents in November, printed in the *Railway Age Gazette* of December 22, page 1142.

Blewette Lee On the "President's Labor Program"

Blewett Lee, general solicitor of the Illinois Central, addressed the Traffic Club of Chicago on December 22 on "the President's Labor Program." Mr. Lee said that a general railway strike in the United States would prove more disastrous to the country than any conceivable war. He referred to the legislation for which President Wilson has asked, giving the President authority to take over the operation of railway systems in times of war.

It is even more important, Mr. Lee contended, that the chief executive should have the power to take over the national transportation system in case of a strike. In refutation of the contention of the brotherhood leaders that any interference with their right to strike would impose upon them a condition of involuntary servitude, he stated that the Constitution of the United States protects the right of the individual to leave the service of another, but grants no right to bodies of men to conspire to leave that service in concert. He referred to various court decisions and statutes to show that where the right to strike interferes with the public welfare it has been curbed, among them the so-called "seamen's" decision of the United States Supreme Court in 1897, Robertson v. Baldwin, 165 U. S., 275, and statutes in various States which impose a penalty upon locomotive enginemen who leave their engines before taking their trains to terminals.

In the dissenting opinion in the seamen's case, Justice Harlan stated that members of the army and navy were not allowed to terminate their service at will because they were engaged in public service. Railroad men, Mr. Lee said, were engaged in public service in a very real sense, as the very well-being and life of the nation are dependent upon the transportation system.

Contrary to the representations of the brotherhood leaders, the Canadian Industrial Disputes Act, which prohibits a strike until a public investigation has been made of labor disputes, is a success. From March 22, 1907, until October 18, 1916, the act averted 85 out of 92 threatened railway strikes. To hold a man to his work until an investigation has been made does not take away his right to redress, but does prevent him from forcing unjust demands in the face of an unfavorable public opinion.

Mr. Lee believes the Underwood bill, which provides for the fixing of wages, like the fixing of rates, by the Interstate Commerce Commission, the best solution of the railway labor problem. He expressed his personal disapproval of the plan which, it is reported, is being formulated by representatives of the trainmen and railroads in New York at the present time, providing for a permanent national body, composed of four representatives of the brotherhoods and four representatives of the railroads, for the adjudication of labor disputes. This plan is objectionable, he said, because it gives no adequate representation to the American public.

Union Pacific Insures Employees

The board of directors of the Union Pacific have approved a plan, effective January 1, whereby every employee of the system who has been in the service of the company continuously for one year, and whose compensation does not exceed $4,000, will be provided with life, accident and sickness insurance at the expense of the company. The amount of each life insurance policy will be equal to one year's full wages, with a minimum payment of $500 and a maximum of $2,500. The accident insurance covers total disability resulting from injuries in the performance of the employee's occupation, and consists of half pay during disability, with a minimum of $5 a week and a maximum period of two years, during which payments will hold. The sickness insurance covers illness of a minimum of one week's duration, and also injuries resulting from accidents not occurring in the performance of duty. Its provisions include half pay while the employee is disabled and confined at home, with a minimum payment of $5 a week and a maximum period of 52 weeks, during which the benefits will be operative. An additional indemnity of half wages for a further period of 52 weeks will be made if it appears that an employee becomes totally and permanently disabled for life. The insurance will apply to all employees receiving less than $4,000 per annum, regardless of their age or condition of health, as well as to employees retiring after January 1, on a pension.

Railway Business Association on Rates

The eighth annual report of the general executive committee of the Railway Business Association briefly surveys the railway situation with reference to proposed legislation. Concerning rates it make this statement:

"It is now possible to focus the national thought upon the heart of the problem—the rule which is given by Congress to its regulatory arm, the commission. The present law declares that each rate shall be just, reasonable and non-discriminatory. It is our purpose to recommend that two additional elements be embodied in the statutory rule:

"1. That in regulating rates total revenues shall be permitted sufficient for total legitimate purposes.

"2. That legitimate purposes shall embrace the attraction of investment for improvements and extensions.

"We yield to none in favoring effective federal supervision under conditions advantageous to the whole public, while insuring that the states may retain such jurisdiction as local self-government requires; but at the same time we emphasize this aspect:

"If total revenues are not made adequate for total expenses no question will long remain as between federal and state authority, because sooner or later the federal government under those conditions must take over the roads. In that case the states would lose all voice whatever, and federal regulation, if any, would present the grotesque spectacle of one political officer supervising another whose tenure proceeds from the same source of power as his own. Whoever omits from his prescription statutory obligation upon the commission to permit rates adequate to carry the national business and develop the country leaves out the essential ingredient without which the whole compound is futile.

"Every substantial increase in tonnage brings car-shortage. Only 933 linear miles of road were constructed in the calendar year 1915, and apparently the record for 1916 will barely exceed that figure, although the volume of industrial activity and hence railway earnings is considerably greater than in any previous year. Those who deal with investors continue, as for several years past, to report indifference of their clients toward railway securities except for refunding and for mortgage bonds, now rarely feasible, upon unencumbered property.

"We approve abstention by legislative bodies from dealing with rates. We see no exception even in so costly an item as the eight-hour law. The new legislation, which we urge, is that if at any time in any place rate advances should become necessary in the public interest authority and obligation to sanction them will explicitly reside by statute in a specified branch of the government."

The total membership of the Railway Business Association has increased to 321, the largest number in its history.

Brotherhoods' Wages Unchanged

All of the principal railroads have issued circulars to employees calling attention to the arrangement which has been made between the railroad committees and the attorney general of the United States, in connection with the proceedings to secure a judicial interpretation of the Adamson law. Notice is given that until the decision of the highest court shall be known, the payment of wages will be continued on the present basis; but the accounts are to be so kept that if the law is declared valid the men shall promptly receive any back pay due them under the decision of the court.

The informal conferences which have been held between the National Conference Committee, of railway officers, and representatives of the brotherhoods, during the past few weeks, were understood to have resulted, last week, in an agreement to hold a more formal meeting this week in New York City; but the uncertainty existing concerning many points, and the numerous differences of opinion as to what ought to be done have interposed so many obstacles that at this writing it is expected that no meeting will be held.

Southern Roads Want Share of Cars

In a recent statement to the New Orleans Press, W. E. Farris, vice-president and general manager of the New Orleans Great Northern, stated that unless the smaller railroads of the South get an "even break" in car exchange with the great trunk lines, they will shortly face bankruptcy and scores of industries in Louisiana and Mississippi, employing thousands of men, will be forced to close down. The New Orleans Great Northern owns 1,385 cars, or about 30 per cent more than it requires to take care of the business on its lines. Its connections on an interchange basis owe it 985 cars, and it has about 28 per cent of its ownership of cars on its own rails. Plans to reduce the free time on export shipments in cars on local bills from ten days to five days and to raise the per diem on cars held by foreign lines from 45 cents to 75 cents, will doubtless give the trunk lines a larger supply of cars, but it does not insure protection to the smaller lines.

In a letter to the *Railway Age Gazette*, Mr. Farris supplements his New Orleans interview as follows: Our contention is that Section 1 of the Act to Regulate Commerce makes it obligatory on carriers "to establish through routes and just and reasonable rates applicable thereto; and to provide reasonable facilities for operating through routes and to make reasonable rules and regulations with respect to the exchange, interchange and return of cars used therein," and that the obligation to furnish cars for the operation of through routes rests as heavily on the receiving line as it does on the originating line. The practice of the big trunk lines today is to accept cars used in the operation of through routes from lateral lines until the lateral line supply is exhausted, and then, when it suits their convenience, to give cars to lateral lines and demand a car in exchange for every car delivered.

Railway Business Association Annual Dinner

F. A. Delano, member of the Federal Reserve Board, former president of the Chicago, Indianapolis & Louisville, and Alfred P. Thom, general counsel of the Southern Railway and also general counsel of the Railway Executives' Advisory Committee are announced as the speakers for the eighth annual dinner of the Railway Business Association which will be held at the Waldorf-Astoria Hotel, New York, Tuesday evening, January 16, 1917. The business meeting of the association occurs at 11 a. m. at the Waldorf-Astoria, the election of officers at 1.30 p. m. and the dinner at 7 p. m., doors opening exactly at the hour.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings and places of meeting of those associations which will meet during the next three months. The full list of meetings and conventions is published only in the first issue of the Railway Age Gazette for each month.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, 455 Grand Central Station, Chicago. Next meeting, January, 1917, New York.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 20-22, 1917, Chicago.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, Supt. Timber Preservation, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 23-25, 1917, New York.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual dinner, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

CINCINNATI RAILWAY CLUB.—H. Boutet, Chief Interchange Inspector, Cin'ti Rys., 101 Carew Bldg., Cincinnati. Regular meetings, 2d Tuesday, February, May, September and November, Hotel Sinton, Cincinnati.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh, Pa.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transporation Bldg., Chicago.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, 349 Peoples Gas Bldg., Chicago. Next convention, March 19-22, 1917, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meeting, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—Geo. A. J. Hochgrebe, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Blrg., Buffalo, N. Y.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—F. C. Stewart, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York. Next annual meeting, January 16, 1917, Waldorf-Astoria Hotel, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Pittsburgh Commercial Club Rooms, Colonial-Annex Hotel, Pittsburgh.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August .

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grand Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Piedmont Hotel, Atlanta.

TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria Hotel, New York.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Monday in month, except June, July and August, Hotel Sherman, Chicago.

WESTERN SOCIETY OF ENGINEERS.—E. N. Layfield, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings. Annual meeting, 1st Wednesday after 1st Thursday in January, Chicago.

Traffic News

The southern railroads have announced a fare of one cent a mile in each direction for the 27th annual reunion of the veterans of the Confederate Army, to be held at Washington next May.

Between Christmas and New Year's each dining car on the Northern Pacific had a Santa Claus and a Christmas tree, as well as appropriate holiday decorations. By way of gifts Santa distributed souvenirs among the passengers.

The Railway Commission of Canada has authorized an increase in the rates for demurrage on freight cars beginning January 1, and continuing in force until April 30, 1917. There is no increase until the third day after the expiration of free time; then the rate is $3 a car; for the fourth and each succeeding day the rate is $5 a car.

The attorney general of Maryland, acting in the interest of the city of Baltimore, will appear at the hearing before the Interstate Commerce Commission, which is to be held in New York City January 10, on the application of Jersey City interests for a reduction in the rates on freight from the west, to Jersey City, below the rates to New York City.

The Baltimore & Ohio Southwestern, co-operating with officers of the Federal and State Agricultural Departments, is to run an educational train for farmers along its lines in southern Indiana and Illinois, the itinerary extending from February 5 until February 14, and lectures will be given on stock raising and other subjects of interest to dairymen. Prize cattle will be exhibited.

The superintendent of mail service at New York City says that the volume of mail shipped on Saturday, Sunday and Monday last, was 25 to 30 per cent greater than on any previous holiday occasion. The express companies report similar increases. One express company called on the railroad for about three times as many cars as had been planned for on the first of December.

The traffic bureau of the Boston Chamber of Commerce has called upon the Interstate Commerce Commission to modify its order requiring empty cars to be sent from New England westward. It is declared that the Boston & Albany is doing all that it can, and if it sends cars westward empty it sends them past loads waiting for them. It is claimed that this road is delivering to its western connections as many cars as it receives from them.

The Transportation Club of Fort Worth (Tex.) will hold its first annual banquet on Saturday, January 20. The speakers will include Ben E. Keith, president of the Chamber of Commerce, J. L. West, freight traffic manager of the Missouri, Kansas & Texas lines of Texas, H. M. Mayo, manager of the industrial department of the Southern Pacific, Texas and Louisiana lines, I. M. Griffin, assistant freight traffic manager of the Texas & Pacific, and Horace Booth, traffic manager of the International & Great Northern.

The first annual banquet of the Houston (Tex.) Traffic Club was held on December 15. The principal address of the evening was made by C. K. Dunlap, traffic manager of the Southern Pacific in Texas, on the transcontinental rate situation and the origin of the practices that have grown up in conection therewith. The following officers were elected for the ensuing year: H. M. Mayo, president; Clint Holliday, first vice-president; F. L. Clements, second vice-president; E. J. Peters, third vice-president; S. A. Leffingwell, secretary; A. Kimball, treasurer; A. L. Mockbee and Henry C. Cortes, directors.

In Richmond, Va., recently, a citizen of South Carolina was arrested for having in his possession some whiskey, which he had bought in Baltimore, and was taking to his home in South Carolina. At Richmond he alighted from a train at the Byrd Street station and proceeded thence to the Main Street station, and the arrest was on the charge that it was illegal to have in possession this liquor in the city of Richmond. On trial the accused was acquitted, but the judge held that in a case of this kind the person carrying the liquor must bear the burden

of proof of showing that it was not intended for use within the state of Virginia.

Senator Newlands, chairman of the Senate Committee on Interstate Commerce, at a meeting of the committee on December 20, in presenting to the committee a bill for appropriations for flood control and development in the lower Mississippi river and the Sacramento river, advocated a complete system for the co-ordination of rail, river and ocean transportation. He proposed a large expenditure for river development, declaring that waterways were as essential to transportation as the railways and would, if developed, relieve the railroads of congestion by handling low-grade bulky commodities.

The Traffic Club of Pittsburgh held a semi-annual dinner on December 18. F. A. Ogden, general freight agent of the Jones & Laughlin Steel Company, in an address, declared that freight and passenger rates should be increased to give the railroads sufficient funds to provide better transportation facilities. Commodities used by the railroads have advanced 50 to 100 per cent in price. At the same time the railroads have been granted a 5 per cent increase in rates. If the so-called eight-hour law is declared constitutional, even the small advantage of this advance will be wiped out. As it is, prices go up or down but the railway rates remain the same.

Forty-seven traveling passenger agents, city ticket agents and passenger agents of the Union Pacific system west of Salt Lake City, Utah, convened at Chicago on December 18 and 19, for the purpose of exchanging information and ideas. On the evening of December 18, a banquet was held at the Union League Club, following which W. B. Leffingwell, head of the lecture bureau of the Union Pacific System, presented motion pictures of scenes in Estes Park, Yellowstone Park and along the northern Pacific Coast. As the result of an inquiry by Gerrit Fort, passenger traffic manager, it was found that every passenger solicitor and ticket seller present had traveled over all of the main lines of the Union Pacific at least once.

Horace Bowker, president of the National Fertilizer Association, has issued a circular calling on farmers to co-operate with railroads and dealers in economizing in the use of cars during the coming season. The fertilizer movement is usually crowded into six or eight weeks, but there is likely to be a great demand the coming spring, and the railroads are likely to be unable to furnish the requisite number of cars. But, says Mr. Bowker, shipments will be moved promptly and will reach the farmers in plenty of time, if orders are made early, thereby relieving the congestion and extending the length of the shipping period. All concerned are urged to see to the ordering of as near maximum quantity in full capacity cars as possible instead of minimum cars of fifteen tons, which is the customary load. The farmer is reminded that the shipping of fertilizers early is of advantage in other ways. He can haul them to his farm before the rush of spring work starts. In many sections it is of advantage to haul on the snow before the roads break up in the spring. When the farm work is least rushing and labor costs of hauling are lowest, is the profitable time for such hauling.

Economy Under a Seventy-Five Cent Per Diem

O. C. Castle, car service agent of the Southern Pacific's Texas and Louisiana lines, recently issued a bulletin showing why the increase in the per diem rate from 45 cents to 75 cents should prove an additional incentive to efficient operation. During the months of July, August, September and October, 1916, under the old per diem rate, the Southern Pacific lines in Texas and Louisiana so increased their efficiency in moving and loading freight cars that a saving in per diem of $108,000 was made. The advance in the per diem cost on December 15, represents an increase of 66⅔ per cent in the rental cost of a freight car. The immediate effect of this increase on these Southern Pacific lines was to add to the expense of operation a net amount of approximately $1,200 a day, with no corresponding increase in revenue. If 45-cent car days are worth saving, says Mr. Castle, the 75-cent days certainly justify increased vigilance.

To give a concrete idea of what the freight car rental amounts to, Mr. Castle prepared the following computations: To pay the 75 cents for the use of one freight car one day, one ton of freight must be hauled approximately 300 miles. One day's delay to three cars represents a day's wages for a warehouseman. The entire operating cost of a switching engine and crew for 10 hours amounts to less than the per diem on 67 cars for a 24-hour period. The cost of unloading and reloading a car of lumber is less than the rental of a freight car for five days. The per diem expense of holding over the billing of four cars from 6 p. m. until the following day would pay for an additional bill clerk. To deliver 35 cars to a connecting line at 12.01 midnight, instead of two minutes earlier, is to lose an amount equivalent to the wages of a switching crew for an entire day. Ten days' delay in unloading a car of ties is equivalent to the loss of 15 ties. Two hours' delay in furnishing a locomotive called for a train of 75 cars causes car detention equivalent to the pay of a hostler for two days. Two days' unnecessary delay to a car on repair tracks costs more than a new journal brass.

Freight Congestion in the West

The embargoes placed by eastern roads on all freight from the west, with a few minor exceptions, destined to points east of the Indiana-Illinois State line, and mentioned in the *Railway Age Gazette* of December 15, have caused severe congestion on western lines. Thousands of cars consigned to eastern points are standing on the tracks in the Chicago terminal district and on sidings west of that city, in some instances, as far as the Missouri river. With the coming of severe cold weather and increased business in the holiday season, the situation became increasingly serious. One large western line, at the time of writing, would receive no freight consigned to Chicago other than from points on its own line. Other roads refused to accept cars unless it was definitely found that the consignees were prepared to unload them. Some lines were so badly congested that they would receive no cars from connecting railways unless the latter took an equal number of cars from them. Typical of the situation is an instance cited by an operating officer in Chicago to the effect that in order to get at one car he found it necessary to move 40 cars a mile and a half.

The problem has been complicated by the coal stringency, which was accentuated by the arrival of severe weather. Not only has the lack of coal been felt by industries, public utilities, public institutions and private consumers, but by the railroads themselves. An operating officer of a large western line said that never before had his road operated with such a small surplus coal supply. Another large western line, at the time of writing, had on hand only a 24-hour supply of fuel. In order to continue business railroads have been forced to buy coal on the open market at high prices, being unable to secure deliveries of contract coal. On December 21, representatives of railroads centering in Chicago met with representatives of the United States Department of Justice to discuss ways and means of relieving the coal situation. As a result of the conference the railroads agreed to co-operate in moving coal shipments as expeditiously as possible. To this end some lines have lent locomotives to others which were unable to move coal standing on their tracks.

The congestion of freight in this country, according to B. L. Winchell, director of traffic of the Union Pacific, starts at the English ports, where British railways are unable to unload ships promptly, and extends across the ocean, and thence from New York across the continent to the Pacific Coast. How far the effects of the accumulation of cars in the east have reached was brought out when the Union Pacific found it necessary to place an embargo on all competitive freight coming from, or going to, connecting lines, effective from December 26 to January 7. Some railroad officers are of the opinion that the situation will not grow much worse, and hold out hopes of gradual improvement from now on. The number of cars consigned to eastern points now being held on western lines will not be further increased because of the existence of the embargoes, but on the contrary will be decreased slowly as eastern roads find it possible to dispose of them. Wherever possible the railroads are obtaining the permission of the shipper to move his cars over alternative routes, thus being able to take advantage of any possible means of access to the east. With the holiday business disposed of, there will be less business to handle, and as trainmen become acclimated to the cold weather operating efficiency will increase. A period of mild weather would further relieve the situation, as would the lifting of some of the eastern embargoes.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission has suspended, until April 23, proposed increased rates on coal from Gallup, N. M., to various points in Arizona.

The commission has suspended until April 20, a tariff of the Old Dominion Steamship Company, providing for the withdrawal of through rates on cotton from Norfolk, Pinners Point and Portsmouth, Va., to various interior New England points.

The commission has further suspended, from December 31 until June 30, the cancellation of joint export rates on grain and grain products from points on the Kansas City, Mexico & Orient to New Orleans and other gulf ports via the St. Louis-San Francisco.

Examiner-Attorney Thurtell, of the Interstate Commerce Commission, has just completed a series of hearings regarding the adjustment of transcontinental freight rates, the case having been reopened by the commission on an order of October 17. Hearings were held at Chicago, Salt Lake City, San Francisco, Portland and Spokane. Representatives of Pacific Coast cities objected to any increase in the terminal rates because of the abatement of competition via the Panama Canal on the ground that that condition is but temporary. Representatives of the intermountain cities asked reductions in the rates to the intermountain territory. The railroads took the position that making rates to meet water competition on the coast has no relation to the rates to the intermediate points, and that the roads should be able to meet competitive conditions on the coast without affecting the intermediate rates. At the time of the hearing at Salt Lake City, representatives of the intermountain interests effected an organization to prepare data to submit to Congress in an effort to secure a repeal of the provision in the fourth section of the commerce act, which authorizes the commission to allow the carriers in its discretion to depart from the strict observance of the long and short haul rule. Senator Poindexter of Washington has introduced a bill in Congress for this purpose.

Wheat from Minneapolis

Minneapolis Traffic Association et al. v. Ann Arbor Railroad et al. Opinion by Commissioner Clark:

Following Through Routes and Through Rates, 12 I. C. C., 163, Held, That defendants having formed through routes from the points of origin of wheat milled at Minneapolis, Minn., the product of which was forwarded thence to destinations in central freight association and trunk line territories, the legal rates for the movement east of Chicago and other Illinois and Indiana junction points to such destinations were the reshipping rates on grain products in effect at the time the shipments of wheat originated. (42 I. C. C., 76.)

Print Paper from the Soo

Lake Superior Paper Company, Limited, v. Minneapolis, St. Paul & Sault Ste. Marie et al. Opinion by Commissioner Clements:

Differential of 6 cents per 100 lb. in the rates on news print paper, carloads, from Sault Ste. Marie, Ontario, over the rates from Wisconsin producing points to points west of the Mississippi river, found not to be unjustly discriminatory. Complaint dismissed. (42 I. C. C., 109.)

Rates on Tar to Kansas City

F. J. Lewis Manufacturing Company v. Chicago, Burlington & Quincy et al. Opinion by the Commission:

Charges on 18 carloads of petroleum tar, in tank cars, from Des Moines, Iowa, to Kansas City, Mo., not shown to have been unreasonable. Charges were collected at the published rate based on estimated weights for the transportation of petroleum tar in tank cars from Omaha, Neb., to Kansas City, Mo., and Memphis, Tenn.; Held, That the charges collected were unreasonable to the extent that they exceeded charges based on actual weight at a rate of 7 cents per 100 lb. for the shipments to Kansas City, and at the published rate for the shipments to Memphis. Reparation awarded. (41 I. C. C., 671.)

Stopping Hogs at Winona

Interstate Packing Company v. Chicago & North Western. Opinion by Chairman Meyer:

Defendant's rule permitting shipments of live hogs in carloads to be stopped at Winona, Minn., for sorting and finishing loading, while no like service is provided at stations within complainant's shipping territory, found unjustly discriminatory. Discrimination ordered removed. Services performed by defendant at Winona, Minn., are not unlawful if performed without unjust discrimination. (41 I. C. C., 189.)

Lumber Rates on the Santa Fe

Lutcher & Moore Lumber Company et al. v. Texas & New Orleans et al. Opinion by Chairman Meyer:

Joint rates on yellow-pine lumber from points in Texas and Louisiana, where complainants' mills are located, by way of the originating line and the Gulf, Colorado & Santa Fe Railway, to points on the lines of the Santa Fe system in the state of Oklahoma, found to be unjust and unreasonable and unjustly discriminatory to the extent that they exceed the rates in effect from points on the Santa Fe system in Texas and Louisiana to the same points of destination. (42 I. C. C., 88.)

Estimated Earnings for the Calendar Year

The Interstate Commerce Commission has given out a statement showing that for the first nine months of the year 1916, the gross earnings of the railroads of the country, including only those of class 1 (excluding those of which the total gross income is less than $1,000,000), will amount to over two and a half billions; and for the twelve months of the year, estimating the last three as being equal to the preceding quarter, $3,600,640,502. Net income from operation is calculated at over one billion.

The principal figures in the statement are:

	Nine months ending Sept. 30	Twelve months ending Dec. 31 Estimated
Gross receipts	$2,654,829,647	$3,600,642,502
Freight	1,875,019,990	
Passenger	522,103,907	
Mail	45,348,600	
Express	65,089,474	
Miscellaneous	60,414,597	
Other	76,087,611	
Operating expenses	1,744,160,022	2,346,066,990
Maintenance of way	320,157,526	
Maintenance equipment	441,740,069	
Conducting transportation	858,973,536	
Traffic	46,679,422	
Miscellaneous	19,904,769	
General	61,996,428	
Net operating income	785,558,266	1,097,982,638

The average of the gross receipts per mile of road, for 12 months, figures out at $15,655, and the average net at $4,774.

STATE COMMISSIONS

The Illinois Public Utilities Commission has suspended for 120 days the passenger tariffs, recently filed by the railroads increasing fares to 2.4 cents a mile. This increase was made for the purpose of removing the discriminating difference between intrastate rates and those for interstate traffic approved by the Interstate Commerce Commission.

The Railroad Commission of Louisiana has granted an application of the Kansas City Southern for a hearing on intrastate cotton rates to New Orleans, La. On account of a decision of the Interstate Commerce Commission in what is known as the Memphis case, the Louisiana lines are confronted with the alternative of advancing cotton rates to New Orleans or reducing the rates to Memphis, St. Louis et al. In compliance with that order they have published for intrastate application cotton rates from Louisiana points to New Orleans, showing advances.

PERSONNEL OF COMMISSIONS

Clifford Thorne, chairman of the Iowa Board of Railroad Commissioners, has resigned, effective January 1, to become special counsel of the National Live Stock Shippers' Protective

Association and the Corn Belt Meat Producers' Association, with headquarters at Chicago, Ill.

COURT NEWS

Crossing Accident—Proximate Cause

A highway was carried over railroad tracks by a bridge 20 to 30 feet wide, the approach to which was about 200 feet long. Barriers had been erected on each side of the approach next to the bridge between 60 and 80 feet long. A person driving along the highway had nearly crossed the bridge, when his horse became frightened by a passing switch engine and began backing. The horse backed across the bridge, down the approach beyond the barriers, and finally backed the buggy over the embankment, killing the occupant. In an action for his death the district court for the western district of South Carolina held that the proximate cause of the injury was the frightening of the horse, and not any defect in construction of the approach to the bridge, the horse being frightened by the necessary noise and smoke of the engine. For this the railroad was not liable. Though it was negligent in not placing barriers on the approach, the fact that the horse backed down the approach for a long distance beyond the barriers, which had been erected, constituted an intervening cause, freeing the railroad company from liability, as when the horse took fright the deceased was in a place protected by barriers.—Hunt v. Southern, 236 Fed., 157.

Notice of Claim for Damages to Live Stock

The Texas Court of Civil Appeals holds that a written contract for the interstate transportation of live stock requiring notice to an agent of the carrier, before the stock shall have been removed from the place of delivery, slaughtered or intermingled with other stock, of a claim for damage, and that the stock shall not be removed before the expiration of three hours from the giving of such notice, is valid under the interstate commerce act and amendments, the laws of Texas to the contrary notwithstanding.—Atchison v. Smyth (Tex.), 189 S. W., 70.

Assumption of Risk by Trackwalker

The Kentucky Court of Appeals holds that a track walker, who knew that the sides and roof of a tunnel were not in any way supported, and that loose stone and dirt fell on the track, and that it might fall while he was walking through the tunnel, and who knew and fully appreciated the danger, in the absence of any assurance that the place was reasonably safe in which to work, or that the dangerous condition would be remedied, and who voluntarily continued in his employment, assumed the risk of injury from the fall of stone and dirt.—Lexington & Eastern v. Stack (Ky.), 189 S. W., 25.

Crossing Accident—Contributory Negligence

Action was brought for the death of a man killed by an engine as he was walking over a crossing in the evening. He was familiar with the crossing and the path by which he approached it ran for some distance parallel to or near the tracks. The whistle cord on the engine was broken, and the whistle was not sounded for the crossing; but the bell was rung continuously, and the headlight could be seen for half a mile before the crossing was reached. The deceased was a young man in full possession of his senses. The Circuit Court of Appeals, first circuit, held that he was chargeable with contributory negligence in failing to look before going on the crossing.—Boston & Maine v. Titcomb, 236 Fed., 129.

Directions to Passenger

The failure of a ticket agent to inform a passenger on which of two nearby tracks his train will come cannot be made the basis of a recovery for taking the wrong train, in the absence of a request from the passenger for information on the subject, or for something to indicate to the agent that the passenger is likely to take the wrong train. In an action for damages the plaintiff testified that in response to her inquiry the agent (at Hendersonville, N. C.) informed her that the train for Toxaway would leave "from right there [pointing] in five minutes," there being three or four parallel tracks in the direction towards which the agent pointed. There was no evidence to show that the agent indicated any particular one of these tracks, or that the Toxaway train did not, in fact, arrive at and depart from the station at the time named and on one of the tracks indicated; and the departure of the plaintiff on a train running towards Asheville, and not towards Lake Toxaway, was not due to any misrepresentation made by the agent. The Georgia Court of Appeals held that the plaintiff was properly nonsuited.—Dawson v. Southern (Ga.), 89 S. E., 1051.

Taxation

The Georgia Railroad & Banking Company executed a lease of all its property, which required the lessee to deposit $1,000,000 in bonds. The lease was assigned to the Louisville & Nashville and the Atlantic Coast Line, and they operated the property. The required bonds were deposited in New York. The Federal district court for the northern district of Georgia holds that in view of the purpose of the requirement, and despite the fact that these railroads operated the property under a name similar to that of the lessor, the bonds deposited in New York had no situs in Georgia for taxation, on the theory that they constituted capital invested in the demised property.—Louisville & Nashville v. Wright, 236 Fed., 148.

Crossing Accident—Contributory Negligence

The Federal District Court, N. D. New York, holds, in an action for killing the driver of a buggy at a crossing, that one about to drive from behind a railroad station on to the track, who could not see the track for any great distance, is bound to look and listen before venturing on the tracks, and, if necessary, to stop. The tracks of two railroads ran parallel and only a short distance apart, so that travelers on the highway could not distinguish whether a train was on one track or another. The Court held that evidence that it was customary to equip much traveled crossings with an automatic bell is admissible in such an action, but will not, as a matter of law, establish the company's negligence. The questions of the railroad's negligence and the deceased's contributory negligence were submitted to the jury, which rendered a verdict for the railroad.—Hartwell v. Lackawanna, 234 Fed., 112.

"Mental Suffering" of Passenger Must be Proved

A conductor took up a commutation ticket presented by Miss I. H. Gerety which by mistake had been issued to "Mr. I. H. Gerety." Miss Gerety sued to recover damages resulting from the failure of the company's ticket agent to deliver to her a commutation ticket for which she had asked and paid. There was no testimony whatever that tended to show any commotion in the car, or that the plaintiff was made a spectacle of when the conductor took up the ticket, or even that there was any one else in the car at the time. The New Jersey Court of Errors and Appeals holds, reversing a judgment for the plaintiff (95 Atl., 733), that the trial judge erred in charging the jury that the plaintiff was entitled to recover for indignity and mental suffering inflicted on her in having the ticket taken away; and that, in the absence of proof of indignity, or the like, the true measure of damages was the value of the ticket at the time it was taken up.—Gerety v. New York & New Jersey (N. J.), 98 Atl., 400.

Furnishing of Cars

There may be freight of such an unusual and exceptional character that a particular railroad company would not be required to anticipate its offer for carriage and provide facilities in advance for its transportation. In an action for failure to furnish cars for the shipment of lumber, the plaintiffs alleged that they requested the railroad to furnish two cars 40 feet long. The railroad averred that the plaintiffs knew that it did not have such cars, that it endeavored to get the cars, but that there was a car famine and it could not do so. It was held that, while the mere fact that other railroads had refused to furnish the defendant with cars because of car shortage would not necessarily relieve the defendant from liability, the condition of business, the demand for cars,

whether usual or extraordinary, what the defendant had done to provide for ordinary demands, and the ability or inability to get cars at the time were facts for the jury to consider in determining whether the defendant had complied with its duty.—Whalen Southern v. Kent & Downs (Ga.), 89 S. E., 765.

Waking Sleeping Passengers

In an action against a railroad for its conductor's failure to arouse the plaintiff at his destination and for allowing him to disembark three or four miles out of the town on the representation that the train was about one mile out, the plaintiff's contention of fact was that he was asleep when his destination was reached; that the conductor assured him he would be on the lookout for that condition, but that he was not on the lookout. The South Carolina court holds that where a conductor, having cause to expect a passenger is asleep at his destination, fails to awaken him, either wilfully or negligently, when he is apparently asleep, the road is liable for carrying him beyond his destination. There is, however, no duty on the conductor to go through a day coach and arouse every sleeping passenger.—Gilkerson v. A. C. L. (S. Car.), 89 S. E., 549.

Crossing Accident—Lawful Noises

The Oklahoma Supreme Court holds that, in order to give a right of action to an individual for the violation of a city ordinance requiring a railroad to constantly keep a flagman at a street crossing, a causal connection between the failure of the company to comply with the ordinance and the injury received must be shown. The railroad has the right to make all usual noises incident to the moving of its cars, and a person in a buggy, at a public crossing, whose horse becomes frightened at the noise of the movement of the cars, runs away, and causes injury to the person, has no cause of action against the railroad unless the acts of the employees which caused the noise were unnecessary, and were made under such circumstances as to constitute lack of ordinary care; or the noise was recklessly or wantonly made, or done to frighten the horse, and done in the discharge of the servants' business for the company.—Lusk v. Pugh (Okla.), 159 Pac., 855.

Service on Foreign Railroad Corporations

In an action in the Massachusetts courts the point to be decided was whether the defendant railroad company was "engaged in or soliciting business in this commonwealth" within the meaning of the Massachusetts statute as to service of process on such corporations. The question is a federal one upon which the decisions of the United States Supreme Court are controlling. That court has said that "each case of this kind must depend on its own facts."—Washington-Virginia v. Real Estate Trust, 238 U. S., 185. That court has not undertaken to formulate any general rule defining what transactions are essential to the doing of business in the sense that will render the one conducting it liable to service of process. It has gone no further than to say that: "The business must be such in character and extent as to warrant the inference that the corporation has subjected itself to the jurisdiction and laws of the district in which it is served."—St. Louis Southwestern v. Alexander, 227 U. S., 218,227. In that case the facts were that the defendant's name was on the door of an office in New York, together with those of general freight agent, general passenger agent and traveling freight agent. Through one of these agents the plaintiff had had some negotiations and correspondence about his claim and its settlement. It was held that this made the company liable to service of process in respect of that matter in New York. In the present case the railroad engaged a resident to represent it as New England passenger agent, and invested him with considerable authority, consulted him with regard to passenger business, and he took up complaints with the company. On the authority of the Alexander case, the Massachusetts Supreme Judicial Court held the company was doing business in the state. The mere solicitation of business by a foreign corporation commonly has been held not to be the doing of business within the state. It was not necessary in the present case to decide whether a statute providing that solicitation of business would be doing business would be constitutional.—Reynolds v. Missouri, K. & T. (Mass.), 113 N. E., 413.

Railway Officers

Executive, Financial, Legal and Accounting

Benjamin McKeen, general manager of the Pennsylvania Lines West, at Pittsburgh, Pa., has been elected fifth vice-president; and R. E. McCarty, general superintendent of the Southwest system, at Columbus, Ohio, has been elected resident vice-president at Detroit, Mich.

Edward M. Smart, Wisconsin attorney for the Chicago & North Western, the announcement of whose appointment as assistant general counsel appeared in these columns last week, was born at Almond, Wis., May 24, 1851. He graduated from the Evansville (Wis.) Seminary in 1887 and then took a three-year academic course at the University of Wisconsin, graduating from the legal department of that school in 1894. After several years of private practice he entered railway service with the Chicago & North Western in 1912, as an attorney. Subsequently he was appointed attorney for Wisconsin for the same company, with headquarters at Milwaukee, Wis. His appointment as assistant general counsel, with headquarters at Chicago, Ill., becomes effective January 1, 1917.

Edward M. Smart

Edward Ormond Griffin, purchasing agent and general storekeeper of the International & Great Northern, has been appointed assistant to the first vice-president of the St. Louis Southwestern, and assistant to the president of the St. Louis Southwestern of Texas, with jurisdiction over the department of purchasing and of materials and supplies, with headquarters at St. Louis, Mo. He was born on January 3, 1867, at Madison, N. C., and received his education at Brownsville College, Southwestern Baptist University and Nashville College. He began railway work with the International & Great Northern as secretary to the receiver, and in 1891 was promoted to chief clerk to the receiver and purchasing agent of the same road. From May, 1895, to June, 1897, he was assistant to the general manager, being then appointed assistant to the vice-president and general manager in charge of transportation. In 1903 he was made passenger and ticket agent, and in 1904 passenger and freight agent. In 1905 he was appointed Southwestern passenger agent for the Missouri Pacific, and then became demurrage agent for the same company's Texas Lines in 1908. He returned to the International & Great Northern in 1909, and in 1910 was appointed chief clerk to the superintendent. In June, 1911, he was made general storekeeper, and

E. O. Griffin

in May, 1914, he was promoted to general fuel and supply agent of the same road. On the resignation of the purchasing agent and general storekeeper in September, 1914, he was promoted to this position, which he held up to the time his present appointment became effective.

A. J. Gillingham, auditor of passenger traffic of the Pennsylvania Railroad, at Philadelphia, Pa., has been appointed assistant to controller, a new position; W. J. Bingham, assistant auditor of coal traffic, succeeds Mr. Gillingham. The departments of coal traffic and auditor of merchandise traffic have been consolidated under the supervision of an auditor of freight traffic. W. B. Kraft, auditor of miscellaneous accounts, has been appointed auditor of freight traffic and will have three assistant auditors of freight traffic. They will be: A. S. Porter, now assistant auditor of merchandise traffic; J. B. Moffitt, Jr., now chief clerk to the controller, and F. M. McIntyre, now chief accountant to the auditor of merchandise traffic. George B. Rudduck, auditor of merchandise traffic, has been appointed auditor of miscellaneous accounts; and J. F. Reynolds, assistant auditor of disbursements, becomes auditor of disbursements. B. C. Henion, chief clerk to the controller, has been appointed assistant auditor of disbursements; and F. J. Fell, Jr., chief statistician of the accounting department, has been promoted to the newly created position of general accountant. Effective January 1.

Operating

P. F. Gilhula has been appointed chief despatcher of the Arkansas & Louisiana, with office at Monroe, La.

J. S. Raddoch has been appointed superintendent of terminals of the Havana Terminal Railroad, with headquarters at Havana, Cuba.

W. M. Whitenton has been appointed trainmaster of the Missouri, Kansas & Texas, of Texas, with office at Smithville, Tex., vice E. E. Hanna, assigned to other duties.

Joseph H. Elliott, general superintendent of the Texas & Pacific, has been appointed general manager, with headquarters at Dallas, Tex., and Phil Carroll, division superintendent of the Missouri Pacific at Poplar Bluff, Mo., succeeds Mr. Elliott as general superintendent. Effective January 1.

A. D. Brown, assistant to general manager of the Pittsburgh & Lake Erie, at Pittsburgh, Pa., has been appointed general superintendent, vice J. W. Riley, resigned. F. G. Minnick, superintendent of car service at Pittsburgh, has been appointed superintendent of freight transportation, vice N. K. Hoffman, assigned to other duties, and the office of superintendent of car service has been abolished. A portrait of Mr. Minnick and a sketch of his railway career were published in the *Railway Age Gazette* of May 19, 1916, page 1109.

D. F. Crawford, general superintendent of motive power of the Pennsylvania Lines West, at Pittsburgh, Pa., has been appointed general manager. I. W. Geer, general superintendent of the Central system, has been appointed general superintendent of the Southwest system. S. B. Robertson, superintendent of the Cleveland & Pittsburgh division, has been appointed general superintendent of the Central system. R. K. Rochester, superintendent of the Logansport division, has been appointed superintendent of the Cleveland & Pittsburgh division. Bruce D. Cooper, trainmaster of the Michigan division, has been appointed superintendent of the Zanesville division. George Le Boutillier, superintendent of the Richmond division, has been appointed superintendent of the Logansport division. F. J. Simpson, superintendent of the Zanesville division, has been appointed superintendent of the Richmond division.

Traffic

A. B. Calder has been appointed assistant general passenger agent of the Canadian Pacific eastern lines, with headquarters at Montreal, Que.

James Burton, Jr., has been appointed traffic manager of the Shreveport, Alexandria & Southwestern, with headquarters at Kansas City, Mo.

William Hodgdon, freight traffic manager of the Pennsylvania Lines West, at Pittsburgh, Pa., has been appointed traffic manager, and John J. Koch, assistant freight traffic manager, has been appointed freight traffic manager.

Engineering and Rolling Stock

J. E. Bebb, office engineer of the Duluth, South Shore & Atlantic, with headquarters at Duluth, Minn., has been appointed assistant bridge engineer of the Michigan Central, with headquarters at Detroit, Mich., effective January 15, 1917.

B. J. Simmons has been appointed division engineer of the Atchison, Topeka & Santa Fe, with headquarters at Needles, Cal., and with jurisdiction over maintenance of way, bridge, building and water service matters. He succeeds W. L. Bradley, transferred.

Harry C. Allen has been appointed road foreman of engines on the Rocky Mountain division of the Northern Pacific with headquarters at Missoula, Mont., succeeding H. E. Day. E. B. Le Van has been appointed road foreman of engines on the Montana division.

OBITUARY

Ora E. Butterfield, general solicitor of the New York Central lines, with headquarters at New York, died in that city on December 22, at the age of 46.

John McGuire, formerly superintendent of the Spokane, Portland & Seattle, with headquarters at Portland, Ore., died at his home in that city December 15, 1916, age 67.

William David Sanborn, general agent of the Chicago, Burlington & Quincy, with headquarters at San Francisco, Cal., died at his home in that city last week, age 65. He was born at Galesburg, Ill., on April 22, 1851. After leaving school in June, 1870, he entered the service of the Chicago, Burlington & Quincy as a station helper at Wyoming, Ill., and was later appointed relief agent. Consecutively he served as agent at Sheridan, Gladstone, Kirkwood, Wataga, Kewanee and Maquon, Ill. After a period of office work at Peoria, Ill., he was made general agent at Hannibal, Mo., and two years later was appointed district freight and passenger agent, with headquarters at St. Louis, Mo. In 1885 he was promoted to general agent, with office at San Francisco, Cal., which position he continued to hold until the time of his death. He was continuously in the employ of the Chicago, Burlington & Quincy for a period of 47 years.

Fletcher C. Rice, general inspector of transportation of the Chicago, Burlington & Quincy, with headquarters at Chicago, Ill., died at his home in that city, December 22, aged 72 years.

Fletcher C. Rice

He was born January 10, 1844, at Marion, N. Y., and entered railway service in 1863 with the Chicago, Burlington & Quincy as an assistant telegraph operator. Consecutively he passed through the grades of telegraph operator, chief clerk, train despatcher and chief operator of the Galesburg division, with office at Galesburg, Ill. Later he was made chief despatcher and then trainmaster. In August, 1881, he was appointed superintendent of the Galesburg division of this company, and held this position until May, 1888, when he was promoted to the superintendency of all the lines in Illinois. From August, 1902, to July, 1904, he was general superintendent, with headquarters at Chicago, Ill. On July 1, 1904, he was appointed general inspector of transportation for the system, with headquarters at Chicago, Ill. He had long been prominent in the study of transportation matters, and at the time of his death was chairman of the committee on transportation of the American Railway Association, in which he had been active for 23 years. He was also chairman of the joint committee on automatic train stops.

Equipment and Supplies

LOCOMOTIVES

THE UNION PACIFIC has ordered 3 Mallet (2-8-8-0) type locomotives from the Baldwin Locomotive Works.

THE VIRGINIAN RAILWAY has ordered 10 335-ton Mallet (2-10-10-2) type locomotives from the American Locomotive Company.

THE CENTRAL OF NEW JERSEY, reported in the *Railway Age Gazette* of December 15 as being in the market for a number of ten-wheel locomotives, has ordered 10 locomotives of this type from the Baldwin Locomotive Works.

THE ST. PAUL BRIDGE & TERMINAL has ordered 2 Mogul type locomotives from the American Locomotive Company. These locomotives will have 20 x 26-in. cylinders, 51-in. driving wheels and a total weight in working order of 154,000 lb.

THE PARIS-ORLEANS RAILWAY was reported in last week's issue as having ordered 50 Mikado locomotives from the American Locomotive Company. These locomotives will have 23½ x 28-in. cylinders, 65-in. driving wheels, and a total weight in working order of 200,000 lb.

THE FRENCH STATE RAILWAYS were reported in last week's issue as having ordered 100 Consolidation locomotives from the American Locomotive Company. These locomotives will have 23 x 26-in. cylinders, 51-in. driving wheels and a total weight in working order of 161,000 lb.

THE MAINE CENTRAL has ordered 3 Pacific, 4 Mikado and 2 six-wheel switching locomotives from the American Locomotive Company. The Pacific type locomotives will have 25 x 28-in. cylinders, 73-in. driving wheels and a total weight in working order of 260,000 lb. The Mikado type locomotives will have 26½ x 30-in. cylinders, 63-in. driving wheels and a total weight in working order of 275,000 lb. The six-wheel switching locomotives will have 21 x 28-in. cylinders, 51-in. driving wheels and a total weight in working order of 166,000 lb.

FREIGHT CARS

THE VIRGINIAN is in the market for 1,000 freight cars.

THE STODDARD OIL COMPANY has ordered 40 40-ton tank cars from the American Car & Foundry Company.

THE ECONOMY OIL & REFINING COMPANY has ordered 10 50-ton tank cars from the American Car & Foundry Company.

THE RUSSIAN GOVERNMENT has ordered 3,500 12-pood, 4-wheel cars, from the Eastern Car Company, New Glasgow, N. S.

THE ST. LOUIS, BROWNSVILLE & MEXICO is in the market for from 500 to 1,000 wooden box cars and from 50 to 100 steel tank cars.

THE OLIVER IRON MINING COMPANY, Duluth, Minn., has ordered an additional 20 all-steel, 70-ton air-dump cars from the Magor Car Company for delivery in March, 1917.

THE NORTHERN PACIFIC, reported in the *Railway Age Gazette* of November 24 as being in the market for 1,000 box and 500 automobile cars, has ordered these cars from the Western Steel Car & Foundry Company.

THE NORFOLK & WESTERN has ordered 1,000 ventilator box cars from the Mount Vernon Car Manufacturing Company and has dropped its inquiry for 1,000 gondola cars. As reported in last week's issue, this company will also build 1,000 gondola cars in its own shops.

THE UNION PACIFIC has ordered 1,800 refrigerator cars from the American Car & Foundry Company, and will build 700 to 900 in its own shops. It has also ordered 200 box cars from the Seattle Car & Foundry Company, Seattle, Wash.; 200 box cars from the Twohy Brothers Company, Portland, Ore., and 100 tank cars from the General American Tank Car Corporation.

PASSENGER CARS

THE FLORIDA EAST COAST, reported in the *Railway Age Gazette* of December 1 as being in the market for 5 coaches and 3 combination cars, has ordered 8 coaches, 3 baggage and 3 express cars from the Pullman Company.

THE CENTRAL OF GEORGIA, reported in the *Railway Age Gazette* of November 3 as being in the market for passenger cars, has ordered 11 such cars from the American Car & Foundry Company.

IRON AND STEEL

THE WHEELING & LAKE ERIE has contracted for 5,000 tons of 90-lb. open hearth steel rails for 1918 delivery, together with necessary splice bars.

THE DELAWARE, LACKAWANNA & WESTERN has ordered 25,000 tons of rails from the United States Steel Corporation, and 10,000 tons from the Bethlehem Steel Company.

THE SOUTHERN PACIFIC has ordered 54,800 tons of rail for 1918 delivery from the Tennessee Coal & Iron Company. As 81,500 tons had already been ordered for 1917 delivery, the combined tonnage for the two years amounts to 136,300 tons.

SIGNALING

THE UNION PACIFIC is inquiring for 31 caboose cars.

THE OGDEN, LOGAN & IDAHO is inquiring for material for 25 box cars which it will build in its own shops.

THE PITTSBURGH & LAKE ERIE will install a 68-lever electrical interlocking plant at McKees Rock, Pa., and a 104-lever plant at Neville, Pa.

THE SOUTHERN PACIFIC (Texas and Louisiana lines) is to install two electrical interlockings and 9.51 miles of double-track automatic signaling.

THE GRAND TRUNK PACIFIC will install a 20-lever mechanical interlocking plant at a crossing with the Canadian Northern at Prince Albert, Sask.

THE CHICAGO, BURLINGTON & QUINCY contemplates the installation of 207 miles of double-track and 29 miles of single-track automatic signaling.

THE LOS ANGELES & SALT LAKE has increased to 1,500 the order for 1,000 50-ton general service cars reported in last week's issue as having been ordered from the Western Steel Car & Foundry Company.

THE ATLANTIC COAST LINE will install during the coming year seven mechanical interlocking plants; one of 20 levers, one of 8 levers, and five of 5 levers each, the first protecting a crossing and the remainder drawbridges.

THE ILLINOIS CENTRAL has under construction two electric interlocking plants, one of 53 working levers at Pullman, Ill., and one of 11 working levers at Rockford, Ky.; and a mechanical interlocking of 27 working levers at Freeport, Ill.

THE ATCHISON, TOPEKA & SANTA FE will install 43 miles of single-track signaling in Oklahoma and 6 miles of double-track signaling in Colorado and New Mexico. Three new interlocking plants of the electro-pneumatic type will be required at the Galveston (Tex.) causeway, and two mechanical plants are also to be built.

THE ATCHISON, TOPEKA & SANTA FE plans during 1917 to instal block signals on about 84 miles of its lines. This includes the lines from North Pomona, Cal., to San Bernardino, 25 miles; and from Gainesville, Tex., to Ardmore, Okla., 39 miles, both single tracks; and a half dozen short sections on other divisions. Also, the manual block system will be introduced on the line from Hicks, Cal., to Summit, 44 miles. Six interlocking plants are contemplated, including the following: Corwith, Ill., electric, 104 levers; Dallas, Tex., electric, 92 levers. These are both being installed in connection with other roads at crossings. The Corwith installation is being put in by the General Railway Signal Company, and the Chicago & Alton Railroad. The rest of the interlockings are mechanical, the largest being at Fresno, Cal., 48 levers.

Supply Trade News

John D. Ristine has been appointed manager of sales of the Perolin Railway Service Company, St. Louis, Mo., with headquarters at the Peoples Gas building, Chicago.

Robert Hughes, until recently engaged in commercial business at Toronto, Ont., has become associated with the National Railway Devices Company, Chicago, in the capacity of manager of sales, and has already entered upon his new duties.

Ralph G. Coburn, formerly eastern sales manager of the Franklin Railway Supply Company will henceforth devote his entire time to the management of the electrical department and exploitation of the Stone-Franklin lighting equipment.

At a special meeting of the board of directors of the Call Switch Company, New York, Harry A. Pike, assistant to the president, was elected a director and placed in charge of sales, in addition to his other duties, succeeding R. V. Call, director and general manager, resigned.

Harry M. Evans has been appointed eastern sales manager of the Franklin Railway Supply Company with office at 30 Church street, New York. Mr. Evans was born at Meadville, Pa., and was educated in the public schools at that place. He began railroad work as a call boy on the Erie, and served in various positions in the mechanical, transportation and traffic departments of that road. He entered the mechanical department of the Franklin Railway Supply Company, October 1, 1908, as traveling representative and was promoted to assistant western sales manager last August, which position he held at the time of his recent appointment.

H. M. Evans

The Pyle-National Company, Chicago, announces the following appointments: Robert C. Shaal, eastern representative, with headquarters in New York; N. S. Kenney, representative, Munsey building, Baltimore, Md.; W. L. Jefferies, Jr., representative, Mutual building, Richmond, Va.

Burton W. Mudge, president of Mudge & Co., has been made vice-president of the Pilliod Company, in full charge of its western territory. Mudge & Co. have been western representatives of the Pilliod Company for the past four years. A sketch and picture of Mr. Mudge appeared in the *Railway Age Gazette* of September 8, page 433.

A very complete reorganization of the Joliet Railway Supply Company, Chicago and Joliet, Ill., has been effected. The entire capital stock, good-will, patents, property, liabilities and assets of the Joliet Railway Supply Company have been purchased by the Northwestern Malleable Iron Company, Milwaukee, Wis. Possession of the offices and plants of the Joliet company has been taken by the new management and new officers elected. The new company's headquarters have been established at 4052 Princeton avenue, Chicago, where extensive additions and improvements to the plant will be made at once. The company will hereafter manufacture its own malleable iron and two new car specialties will be added to the output, which has consisted of brake beams, side and center bearings, etc. The following officers have been elected: President, C. F. Huntoon; vice-president, F. L. Sivyer; secretary and treasurer, W. F. Hoffman; manager, R. F. C. Schultz; directors, F. L. Sivyer, W. C. McMahon, C. F. Huntoon, W. L. Woods, R. F. C. Schultz, George C. Taylor and Mackey Wells.

Andrew Fletcher New President of American Locomotive Co.

At a meeting of the board of directors of the American Locomotive Company, Tuesday, Andrew Fletcher was elected president to succeed Waldo H. Marshall, who resigned last week. Mr. Fletcher has been a director and a member of the executive committee for several years. A successor to J. McNaughton, the vice-president whose resignation was also accepted by the board last week, to take effect in February, has not been selected.

Mr. Fletcher is president of the W. & A. Fletcher Company, manufacturers of marine engines, with a plant in Hoboken, N. J. The corporation is one of the oldest firms of the kind in the country. He is a director of the William Cramp & Sons Ship & Engine Building Company, president of the Consolidated Iron Works and the North River Derrick Company.

Economy Devices Corporation

J. L. Randolph has been elected vice-president of the Economy Devices Corporation with office at 30 Church Street, New York. Mr. Randolph was born in Boston, Mass., August 25, 1878, attended the public schools and graduated from the English High School of that city. He began his railroad career as a machinist apprentice in the Concord, N. H., shops of the Northern Railroad, now a part of the Boston & Maine. Subsequently he served this road in the capacity of machinist, gang foreman, general foreman, master mechanic, and superintendent of shops at Keene, N. H. In April, 1911, he accepted a position with the Franklin Railway Supply Company in the mechanical department. In February, 1914, he was appointed eastern sales manager of the Economy Devices Corporation which position he held at the time of his recent appointment.

J. L. Randolph

Lukens Steel Company

Announcement was made Tuesday that the Lukens Steel Company will be incorporated under the laws of the state of Pennsylvania, to acquire the capital stock and ultimately the entire property, business and good-will of the Lukens Iron & Steel Company, Coatesville, Pa. The purpose is to increase the capitalization to a figure more nearly commensurate with the assets and earnings than the present capital of $500,000.

The new corporation will have $8,000,000 cumulative 7 per cent first preferred, $6,000,000 cumulative convertible 7 per cent second preferred, and $10,500,000 common stock. The stockholders arranged for the recapitalization through Henry & West of Philadelphia, and White, Weld & Co., of New York, and an offering of part of the first preferred stock will be made shortly.

The Lukens Iron & Steel Company has been owned by one family continuously for more than 125 years. Its business was established at the present location in 1810. The company makes open hearth steel ingots, blooms and billets, which it rolls into sheets and plates for ships, boilers and structural purposes. The present plant has an annual capacity of about 300,000 tons, and on the completion of its new 204-inch plate mill, which will be the largest in the world, together with new open hearth furnaces, its annual capacity will be approximately 450,000 tons. None of the company's product is being sold for the manufacture of munitions or war material.

Railway Construction

AURORA, MENDOTA & WESTERN (ELECTRIC).—This company plans to build a line from Aurora, Ill., to Plano, about 15 miles. The undertaking includes the erection of one pile bridge, three concrete bridges and five concrete culverts. Construction will begin in the spring. H. D. Hallet, chief engineer, Aurora, Ill.

BUFFALO, ROCHESTER & PITTSBURGH RAILWAY.—Work will be begun shortly on the construction of a 3,600-ft. passing siding at Savan, Pa. A new siding, 575 ft. long, is also under construction for the Kittanning Ceramics Company, north of Craigsville, Pa.

HUGO & OKLAHOMA.—This is the name of a new road, which will run from Hugo, Okla., to Atoka, on the Atchison, Topeka & Santa Fe, a distance of approximately 52 miles. At this writing practically all of the right-of-way has been secured, and it is planned to begin actual construction early in the coming year. Ben C. Eastin, secretary, Hugo Chamber of Commerce, Hugo, Okla.

INDIAN VALLEY.—The Utah Construction Company, Ogden, Utah, is constructing a new steam railroad, which will run from Paxton Junction, Cal., a point on the Western Pacific, one mile west of the forks of Spanish Creek, through Indian Falls, Crescent Mills, across Indian Valley to Taylorsville, thence to Engles Mine, following the Indian Creek drainage, a distance of about 30 miles. About 10 per cent of the work has been completed thus far, and it is expected to have the line in operation next summer. The excavation averages about 9,000 cu. yd. per mile, with a four per cent maximum grade, and a 24-deg. maximum curve. The rails and rolling stock will be supplied by the Western Pacific. The estimated cost, exclusive of rolling stock, is $350,000. Charles S. McDonald, chief engineer, San Francisco, Cal.

KEWANEE & EASTERN.—The Illinois Public Utilities Commission has granted permission to this company to construct a steam road from a point in Rock Island county, Ill., just opposite Muscatine, Iowa, through Kewanee, Ill., to a point near Streator, about 120 miles. (November 3, p. 825.)

METHOW VALLEY & EASTERN.—This is the name of a new railroad company, which proposes to build a line into the Methow valley in the state of Washington. The survey, which is now under way, contemplates ultimately a line from Bellingham, Wash., to Spokane, a distance of 349 miles, and provides for a 7-mile tunnel to be driven through the Cascades. The first unit, one of eight to be constructed in this system, will traverse the Methow Valley from the Columbia river to Winthrop. R. E. S. Rominger, president, Indianapolis, Ind.

OUACHITA & NORTHWESTERN.—Construction work is now under way on a 10-mile line from Clarks, La., on the Jackson division, to Standard on the Standard division.

UTAH-IDAHO.—This company is now making surveys, and construction is expected to be started soon on a steam line from Garland, Utah, to Bear River City, a distance of about 10 miles. The line is to be built on the bank of an irrigation canal. After completion the road will be taken over by the Oregon Short Line. Thomas R. Cutler, vice-president and general manager, Salt Lake City, Utah.

RAILWAY STRUCTURES

HUNTINGTON, IND.—The Wabash will receive bids early in the coming year for the construction of a new combination depot, the estimated cost of which will be $20,000. A. O. Cunningham, chief engineer, St. Louis, Mo.

KANSAS CITY, MO.—The Missouri Pacific, the Union Pacific, and the engineering department of Kansas City, are formulating plans for the rebuilding of the James Street viaduct and bridge, connecting this city with Kansas City, Kansas., at a cost of about $125,000. It is not definitely known when bids will be called for. E. A. Hadley, chief engineer, Missouri Pacific, St. Louis, Mo.

Railway Financial News

BOSTON & LOWELL.—Stockholders are to vote on January 3 on the question of authorizing an issue of $200,000 20-year 5 per cent bonds to refund a like amount of 4 per cent bonds due October 1, 1917.

CANADIAN NORTHERN.—The Commercial & Financial Chronicle says that it is proposed to take up 220 miles of track of the mountain section of the Canadian Northern, and to send the material to France. If this is done the Canadian Northern would use trackage rights over the Grand Trunk Pacific line, which parallels the 220 miles of track, which it is proposed to tear up.

CHICAGO, ANAMOSA & NORTHERN.—It is said that this road has been sold, and will be torn up and the track material, cars and locomotives sold.

NEW YORK CENTRAL.—The New York Public Service Commission, Second district, on Wednesday heard petitions from the New York Central asking authority to issue $70,000,000 4½ per cent refunding and improvement mortgage bonds; $12,000,000 4½ per cent equipment trusts of 1917; $100,000,000 20-year 6 per cent bonds, and an amendment to the order permitting it to increase its authorized capital stock from $300,000,000 to $400,000,000.

Stockholders of record January 2 are given the right to subscribe before February 5, 1917, for $25,000,000 new stock at par to the extent of 10 per cent of their present holdings of stock.

PADUCAH & ILLINOIS.—Kean, Taylor & Co. and William A. Read & Co. have bought from the railroad and resold to investors $1,500,000 first mortgage 4½ per cent 40-year sinking fund bonds, guaranteed jointly and severally by the Chicago, Burlington & Quincy and the Nashville, Chattanooga & St. Louis. This makes $4,200,000 of these bonds outstanding.

PERE MARQUETTE.—The reorganization committee has declared the plan of reorganization operative.

PITTSBURGH, CINCINNATI, CHICAGO & ST. LOUIS.—The Pennsylvania Public Service Commission and the Ohio Public Service Commission have approved the plan of the merger of the Pittsburgh, Cincinnati, Chicago & St. Louis and of the Vandalia.

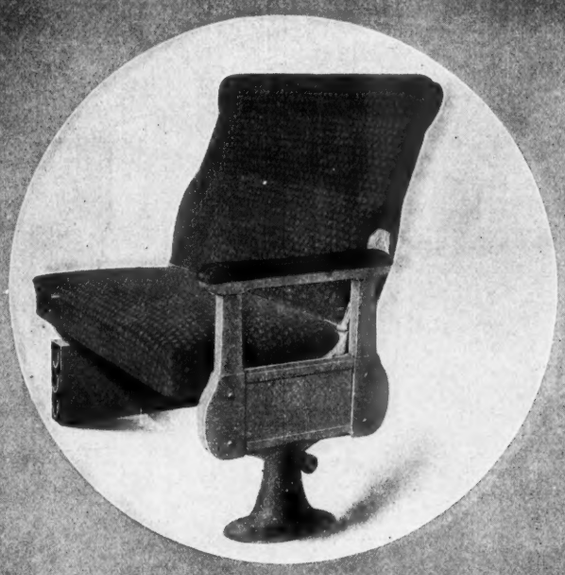
ST. LOUIS-SAN FRANCISCO.—The executive committee representing the bondholders of the Kansas City, Ft. Scott & Memphis announces that the back coupons on these bonds are being paid under the reorganization plan, and since the bonds are not to be disturbed in the reorganization, the committee is to be dissolved.

UNION PACIFIC.—An extra dividend of two per cent has been declared on the common stock.

VANDALIA.—See Pittsburgh, Cincinnati, Chicago & St. Louis.

CRISTOBAL YARDS BEING COMPLETED.—The laying of the remainder of the tracks for a new railroad yard adjoining the concrete piers at Cristobal, Panama Canal Zone, has been begun. The yard had been partially completed for several months, but its completion has been delayed because of the non-arrival of railroad ties ordered from the United States. These are now on hand.

GLASGOW SUBWAY RAILWAY'S PENNY FARE.—Glasgow Subway Railway Company has, it is stated, decided to introduce a universal penny fare over the whole system. The new arrangement comes into force on Sunday, December 10. At present ½d. is charged for traveling to one station, five stations are allowed for 1d., and 1½d. is charged for any distance beyond five stations. Under the new arrangement a penny ticket will carry a passenger to any station on the system. Children under 12 years of age will be allowed to travel for half fare.—*Railway Gazette, London.*



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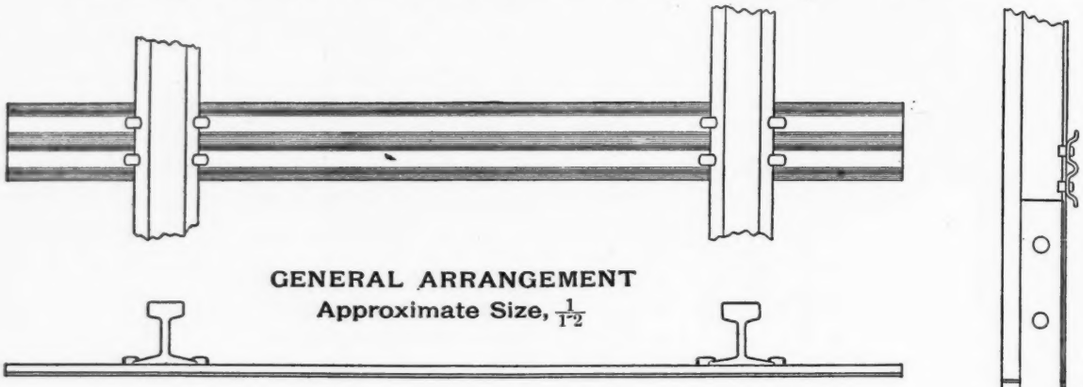

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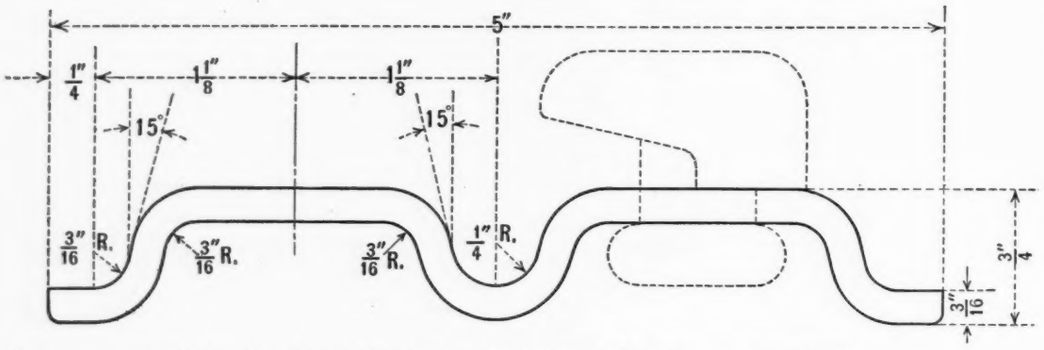

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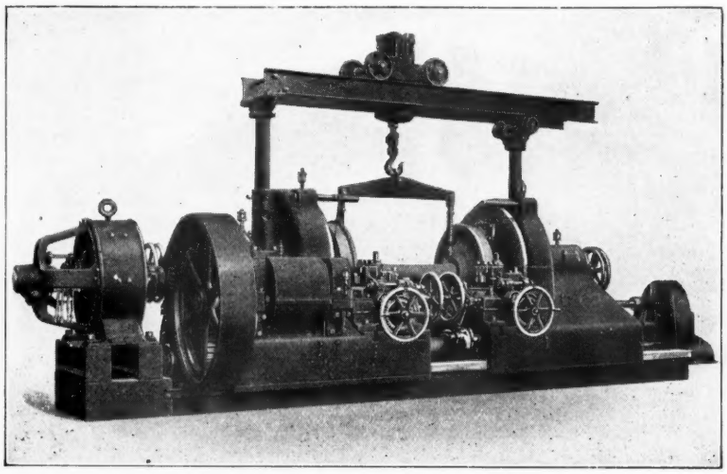

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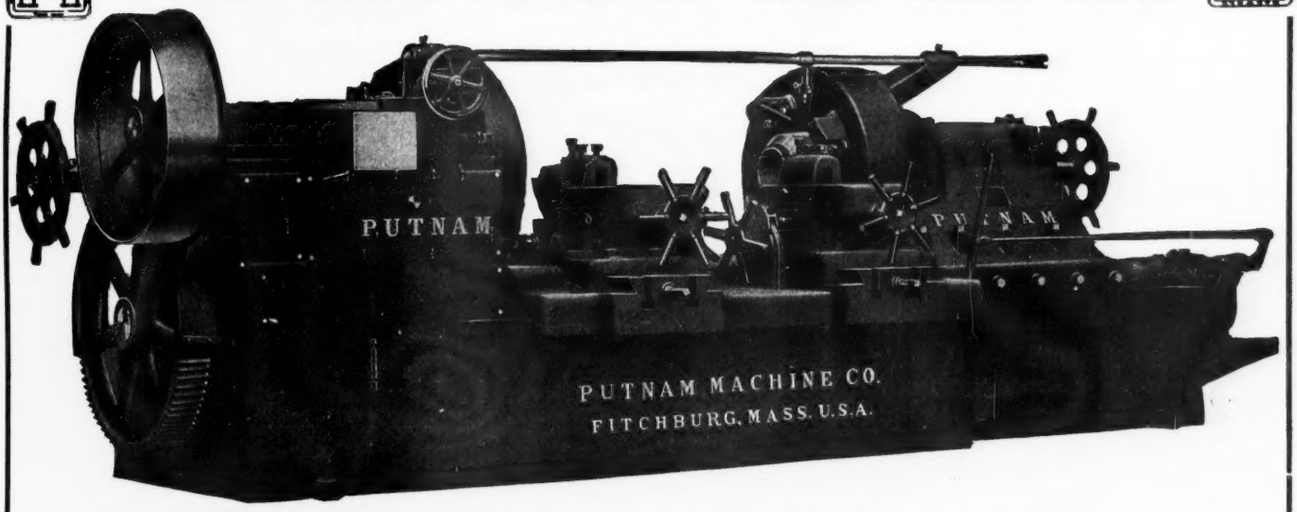

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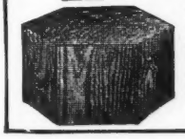

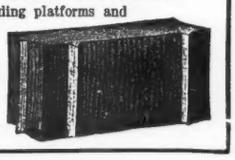

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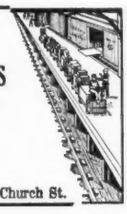

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American Locomotive Co.
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Pittsburgh Forge & Iron Co.
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HOSE COUPLINGS—(SEE COUPLINGS, HOSE).

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IRON, STAYBOLT.
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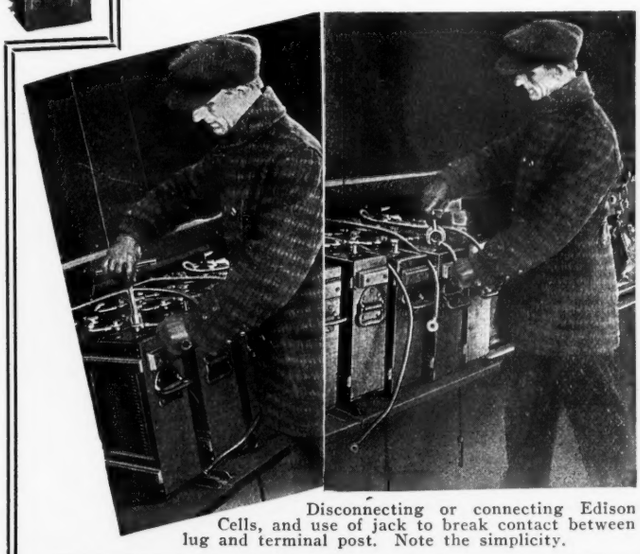
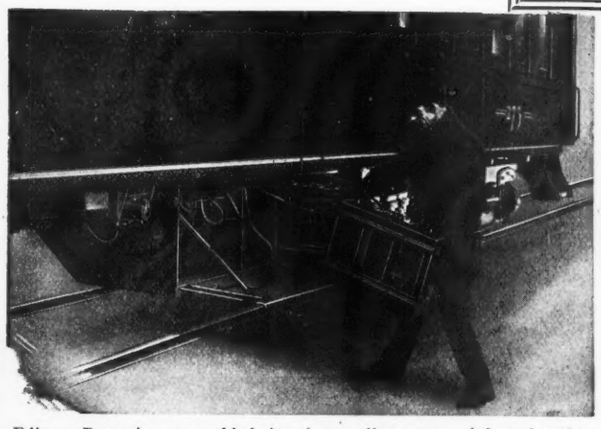
Franklin Railway Supply Co.

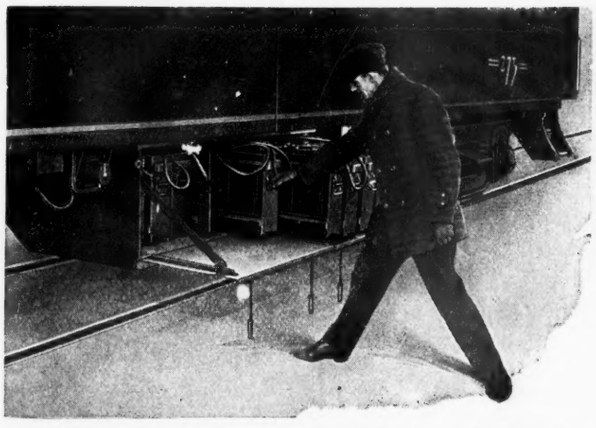
Edison Storage Batteries
For Railway Train Lighting



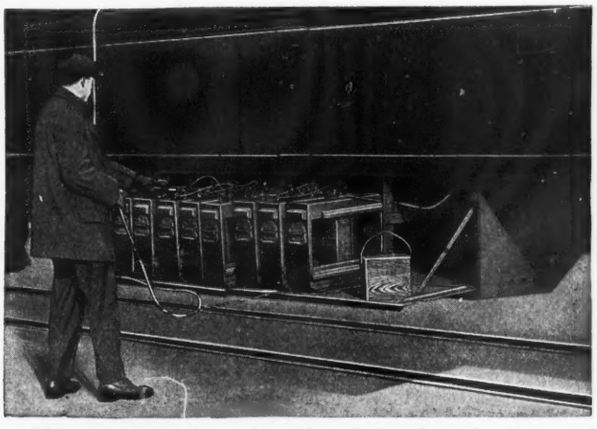
Disconnecting or connecting Edison Cells, and use of jack to break contact between lug and terminal post. Note the simplicity.



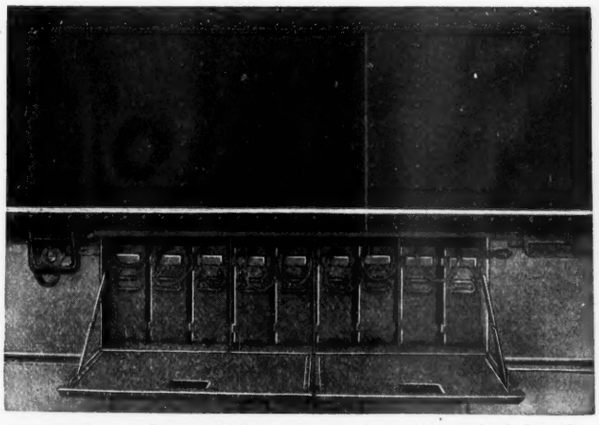
Edison Batteries assembled in three-cell trays weigh only 100 pounds. Note the ease with which the man handles the tray.



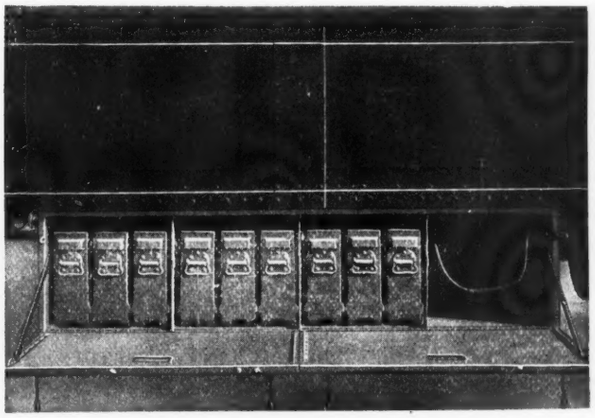
It is only a one-man job to pull Edison Batteries out for inspection.



Adding distilled water to keep the solution above the plates, and solving the problems of low maintenance and maximum life.



The small battery compartment required by the Standard Edison Train Lighting Battery.



That hole represents space other batteries require which the Edison does not. That compartment was built for other batteries, but the Edison is there now. What's the moral? 2,000 lbs. less weight per car.

WRITE FOR BULLETIN 118

EDISON STORAGE BATTERY COMPANY

FACTORY AND MAIN OFFICE, - - - ORANGE, N. J.

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RIGHT: S K F equipped truck made by The Cowan Truck Co., Holyoke, Mass.

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Samuel L. Moore & Sons Corp.
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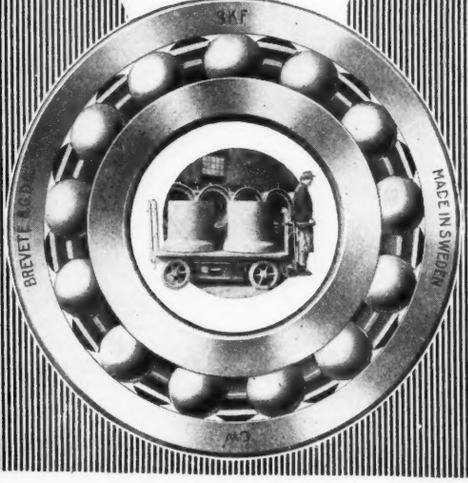
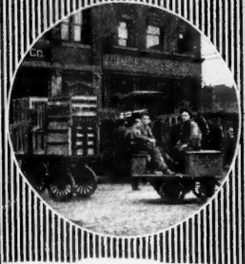
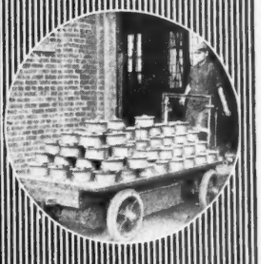




Made By
Orenstein-Arthur Koppel Co.,
Koppel, Pa.



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PLUGS, STEAM CHEST OIL.
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Chicago & North Western Ry.
Wabash R. R.

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Zeinicker Supply Co., Walter A.

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Carnegie Steel Co.
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Lehon Company.
Louisiana Red Cypress Co.

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American Rolling Mill Co.
American Sheet & Tin Plate Co.
Johns-Manville Co., H. W.

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American Sheet & Tin Plate Co.
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Brown Hoisting Machinery Co.
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SCRAP METAL.
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Edward Co., Inc., O. M.

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SHAPES, PRESSED STEEL.
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Pressed Steel Car Co.

SHAPING MACHINES.
Sellers & Co., Inc., Wm.

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American Sheet & Tin Plate Co.

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American Sheet & Tin Plate Co.

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SHEETS, POLISHED STEEL.
American Sheet & Tin Plate Co.

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SIGNAL PIPE.
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SIGNALS.
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Railroad Supply Co.
Simmen Automatic Ry. Signal Co.
Union Switch & Signal Co.

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Julian-Beggs Signal Co.
Miller Train Control Corp.
Simmen Automatic Ry. Signal Co.

SIGNALS, CROSSING.
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Railroad Supply Co.
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Franklin Ry. Supply Co.

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Q & C Co.

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American Steel Foundries.
Pittsburgh Spring & Steel Co.
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Simplex Railway Appliance Co.
Standard Steel Works Co.

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American Vanadium Co.
Pittsburgh Spring & Steel Co.

STACKS, STEEL.
American Bridge Co.
Virginia Bridge & Iron Co.

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STAYBOLT IRON — (SEE IRON, STAYBOLT).

STAYBOLTS.
Breakless Staybolt Co.
Falls Hollow Staybolt Co.
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STAYBOLT SLEEVES.
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STEEL SHEETS AND PLATES.
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Trussed Concrete Steel Co.

STEEL, STRUCTURAL.
American Bridge Co.
Carnegie Steel Co.
Lackawanna Steel Co.
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STEEL, VANADIUM.
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STOKERS, LOCOMOTIVE.
Locomotive Stoker Co.

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Power Specialty Co.
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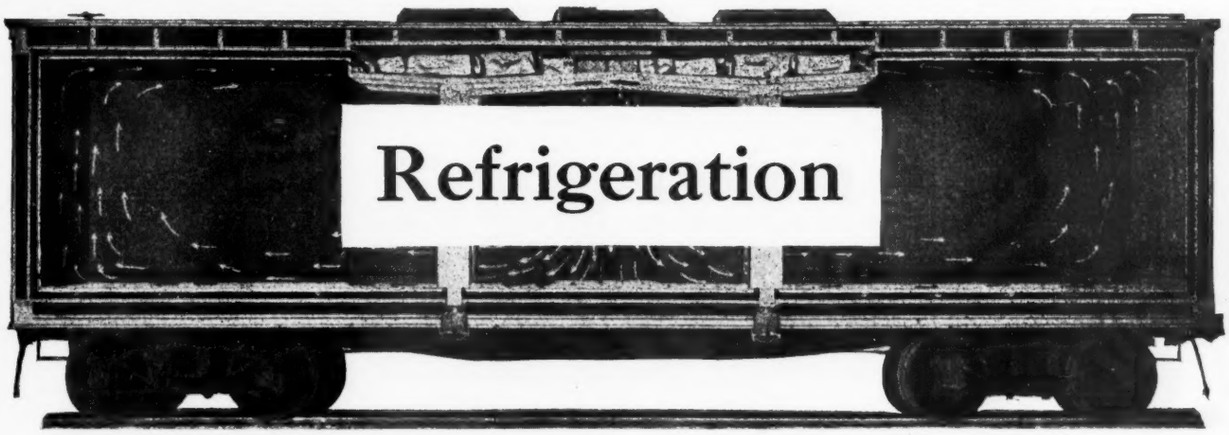
McMyler Interstate Co.
P. & M. Co., The
Ramapo Iron Works.
Union Switch & Signal Co.
Western Electric Co.



MOORE SYSTEM CAR IN USE FOR REFRIGERATION

THE SCIENTIFIC SOLUTION OF YOUR PERISHABLE FREIGHT PROBLEM

The scientific as well as the economical solution of that Perishable Freight Problem of yours is shown in the car illustrated on this page.
A car adaptable for such service in **any** climate in **all** seasons of the year. A car which refrigerates, heats, ventilates scientifically and works **with,** not against nature's laws. That is not all, the

MOORE SYSTEM REFRIGERATOR & HEATER CAR

Carries 20% more load under ice or heat than any end-ice box car. Its use means 20% less equipment to purchase, to operate and to repair, and more, it delivers its load fresher and purer than any other car.

REFRIGERATION

Dryness, that essential to proper preservation of load is assured. Free and positive circulation of the air assures this, removing as it does the causes of decay. Other systems may keep **part** of a load cold. The Moore System keeps **all** the load cold.
The following extract from a letter written by Tubbesing & Nelson of St. Paul is but one example out of many, of the satisfactory service assured by use of Moore System cars.

"We found the interior of the car perfectly dry with no sign of moisture, or any foul smell of air, gas or smoke. The fruit arrived in perfect condition. There was not the slightest sign of any chilled bunches at the bottom, although the car passed through a temperature below zero."

Moore System
Refrigerator and Heater Car

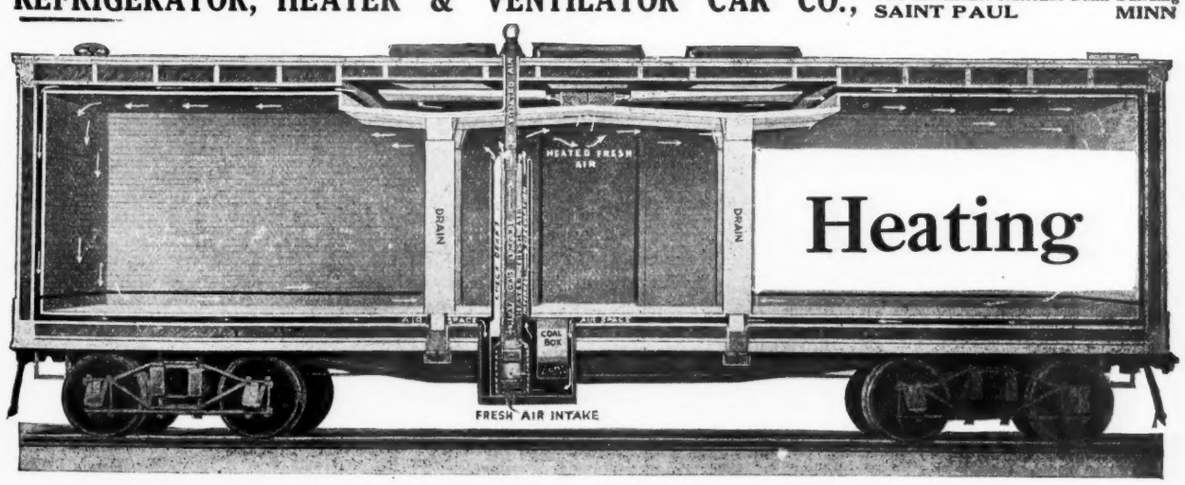
HEATING

Briefly, the main advantages of the Moore System of heating are—the load is protected against frost in the coldest weather; fresh air of proper temperature is constantly supplied, cold air, gases, fumes and odors are constantly removed and the load kept **fresh,** not wilted, shriveled, smoked, tainted or frozen. Ten to fifteen cents per car per day operates the heater, which is simple, operates from **outside** of car, and requires no special attendant.

You can secure savings and greater business which will show up big on the right side of the ledger by using Moore Refrigerator, Heater & Ventilator cars. Prove it! We will let the testimony of actual users prove it, if you will say the word. Write today.

The Car for All Kinds of Weather and All Seasons

REFRIGERATOR, HEATER & VENTILATOR CAR CO., 924 Merchants National Bank Building SAINT PAUL MINN



MOORE SYSTEM CAR IN USE FOR HEATING

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TACKLE BLOCKS.
Boston & Lockport Block Co.

TAMPING MACHINES, TIE—(SEE TIE TAMPING MACHINES).

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Commonwealth Steel Co.
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McConway & Torley Co.
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U. S. Metal & Mfg. Co.

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McMyler Interstate Co.
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W. Harding Davis.

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Pyle-National Company, The

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O'Malley-Beare Valve Co.
Wood & Co., R. D.

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American Balance Valve Co.
Hammett, H. G.
Pyle-National Company, The

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Crosby Steam Gage & Valve Co.
Detroit Lubricator Co.
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Manning, Maxwell & Moore, Inc.
Nathan Mfg. Co.
National Tube Co.
O'Malley-Beare Valve Co.

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Sherwin-Williams Co.

VARNISH GUMS.
Standard Asphalt & Rubber Co.

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Keppler Glass Constructions, Inc.
Johns-Manville Co., H. W.
Sturtevant Co., B. F.

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Lillie, Dexter P.

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Whiting Fdy. Equipment Co.

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Q & C Co.

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Platt Iron Works.

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Cement-Gun Co., Inc.
Johns-Manville Co., H. W.
Lehon Company.
Standard Asphalt & Rubber Co.
Union Fibre Co.

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Perolin Ry. Service Co.
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General Electric Co.

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General Electric Co.

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Commonwealth Steel Co.
Standard Steel Works Co.

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Sellers & Co., Inc., Wm.
Wood & Co., R. D.

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American Steel Foundries.
Association of Manufacturers of Chilled Car Wheels.
Carnegie Steel Co.
Griffin Wheel Co.
Johnson & Co., J. R.
Lansing-Co.
Lima Locomotive Works, Inc.
Pressed Steel Car Co.
Railway Steel-Spring Co.
Standard Steel Works Co.

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Ashton Valve Co.
Crosby Steel Gage & Valve Co.
Edna Brass Mfg. Co., The
General Electric Co.
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WIRE.
American Steel & Wire Co.
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Kerite Insulated Wire & Cable Co.
Okonite Company.
Western Electric Co.

WIRE, INSULATED.
American Steel & Wire Co.
General Electric Co.
Goodrich Co., B. F.
Kerite Insulated Wire & Cable Co.
Okonite Company.
Western Electric Co.

WIRE ROPE TRAMWAYS—(SEE CABLEWAYS).

WIRE, VANADIUM.
American Vanadium Co.

WOOD BLOCK FLOORING.
Ayer & Lord Tie Co.
Jennison-Wright Co.
Wyckoff Pipe & Creosoting Co., Inc.

WOOD PRESERVATIVES.
Barrett Co., The
Wyckoff Pipe & Creosoting Co., Inc.

WRECKING CARS—(SEE CARS, WRECKING).

YELLOW PINE, (LONG AND SHORT LEAF).
Brooks-Scanlon Co.
Jennison-Wright Co.
Newman Lumber Co., J. J.

TITANIUM

Effect On Segregation

M. H. Wickhorst, Engineer of Tests for the American Railway Engineering Association, has stated recently that 50 per cent of the total rail failures is due to segregation.

If you really want a better rail you can get it by specifying Titanium Treatment in accordance with our recommended practice and putting it up to us to see that our product is properly used.

Send for our Booklets: They tell why Titanium-Treated Rails wear longer.

Titanium Alloy Manufacturing Co.

Operating Under Rossi Patents
General Office and Works:
Niagara Falls, N. Y.

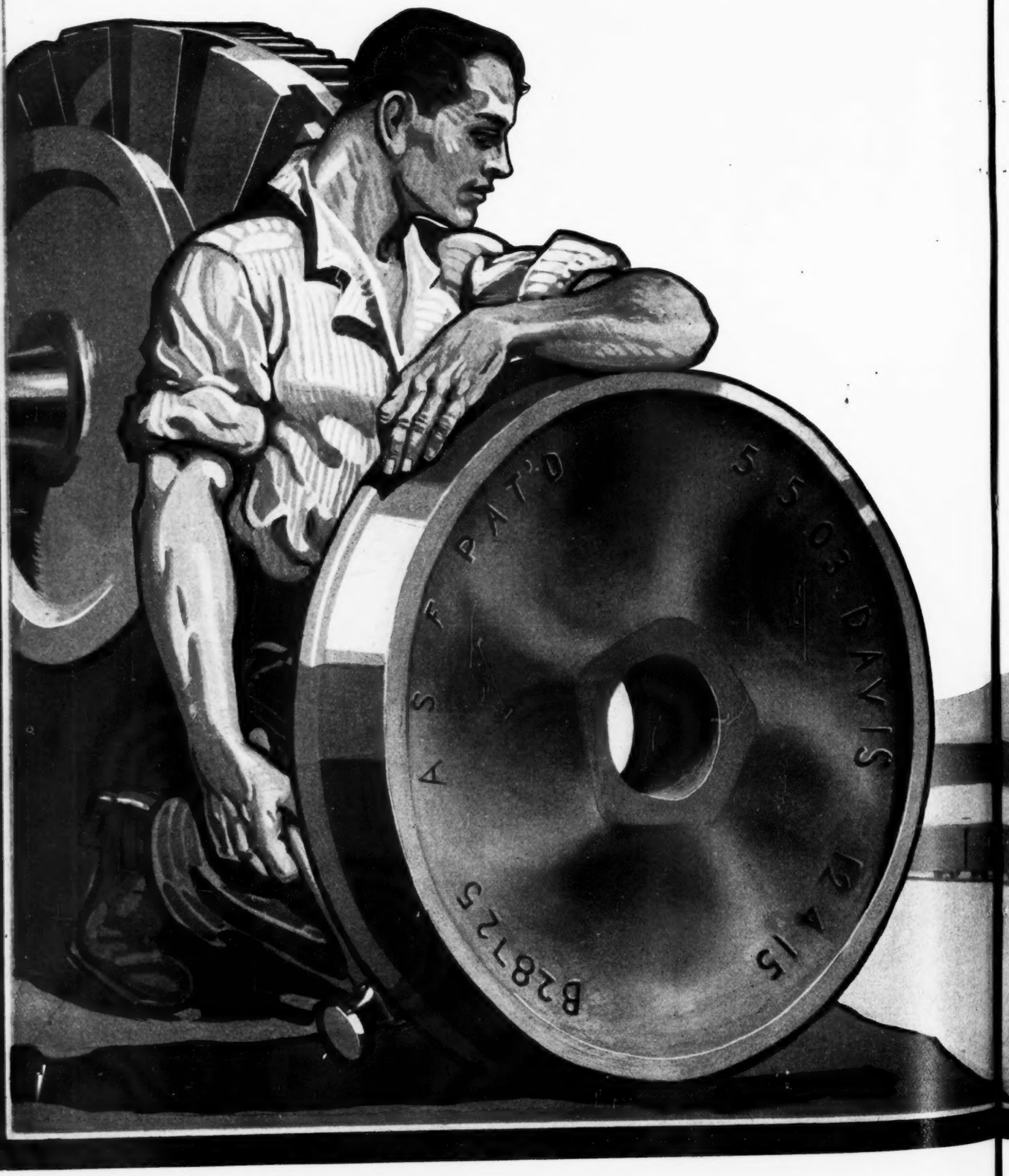
TPC
Reg. U. S. Pat. Off.
TRADE MARK.

Processes and Products Patented
Pittsburgh Office: Oliver Bldg.
Chicago Office: Peoples Gas Bldg.
New York Office: 15 Wall Street

Agents:
Great Britain and Europe: T. ROWLANDS & CO., Sheffield, England

TITANIUM

It's the -



-cost of maintenance

The big factor in the wheel question is the cost of maintenance. It must be included in the determination of total wheel costs.

Turning of wheels, with the incident losses and expenses, increases the cost of maintenance.

Frequent renewals because of slid-flats, chipped flanges and cracked plates increase the cost of maintenance.

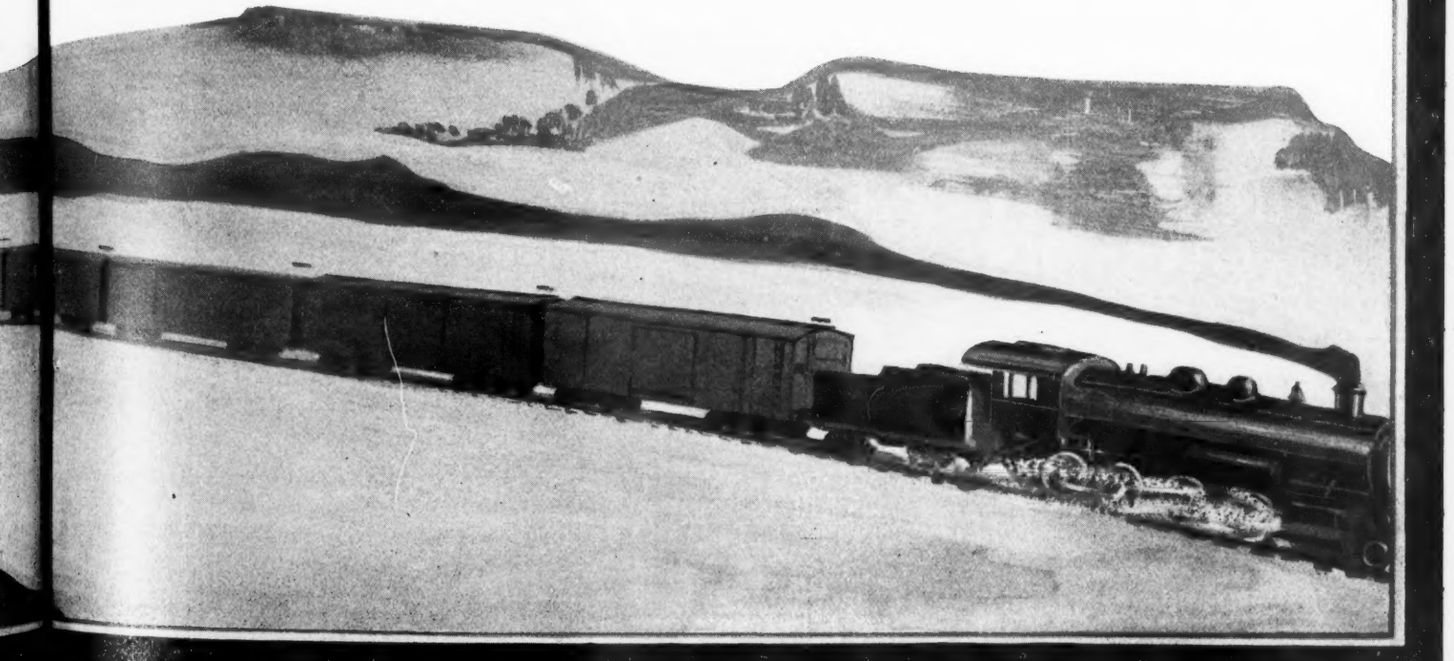
It's the ***low*** cost of maintenance which has been a deciding factor in the success of the Davis Steel Wheel.

The hard, tough manganese steel rim of the Davis Wheel eliminates turning, resists wear and shock, and lowers the cost of maintenance.

Keep the cars moving—on Davis Wheels.

American Steel Foundries

NEW YORK CHICAGO ST. LOUIS



AN INGERSOLL-RAND CONDENSING PLANT

IN NEW JERSEY

This installation consists of a Beyer Counter-Current Barometric Condenser, two Ingersoll-Rogler steam-driven Dry Vacuum Pumps and a Cameron Centrifugal circulating water pump.

This plant acts as a central condenser handling the exhaust from steam turbines aggregating 2900 horse power.

The operating conditions call for the maintenance of a 28-inch vacuum with cooling water at 80 degrees.

The Ingersoll-Rand Company is prepared to quote on complete barometric condensing plants.

ASK FOR NEW BULLETIN NO. 9024

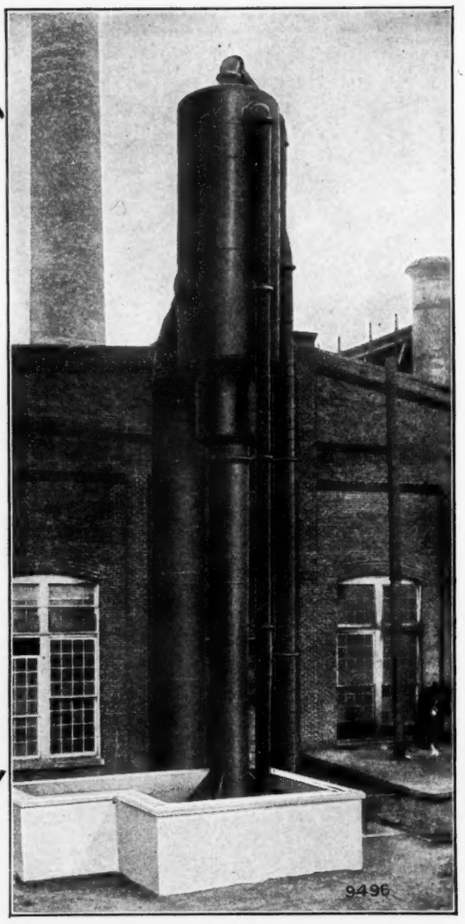
INGERSOLL-RAND COMPANY

11 Broadway NEW YORK — Offices the World Over — 165 Q. Victoria St. LONDON

For Canada, address Canadian Ingersoll-Rand Company, Montreal

AIR COMPRESSORS PNEUMATIC TOOLS

14-BC



F. E. RICHARDSON PRES. & TREAS. ESTABLISHED 1865 W. I. MILLER SECRETARY

PITTSBURGH FORGE & IRON CO.

PITTSBURGH, PA.

MANUFACTURERS OF

CAR

HEAT TREATED ATLAS TOUGHENED CRANK PINS AXLES PISTON RODS

LOCOMOTIVE

— MERCHANT REFINED IRON —

ATLAS STAY BOLT AND ENGINE BOLT IRON

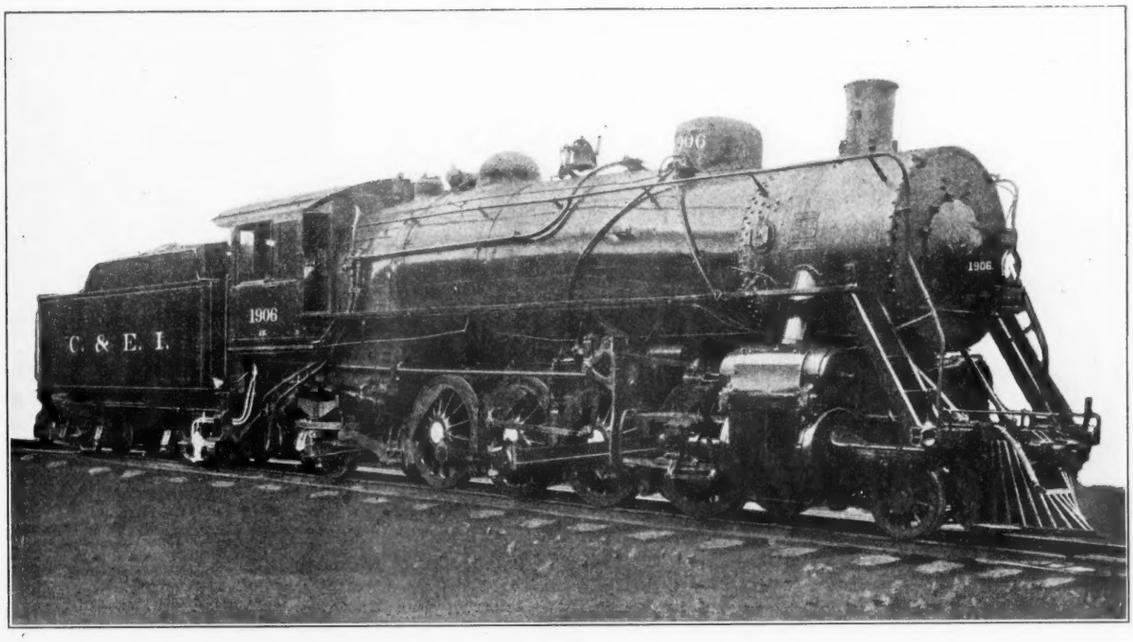
THOR IRON FORGING BLOOMS,

— SCREW SPIKES — HEAVY FORGINGS — TRACK BOLTS —

ARCH BARS, FOLLOWER PLATES, TIE PLATES.

CHICAGO OFFICE RAILWAY EXCHANGE BLDG.

Miller Train Control



The use of the Miller Train Control in no way interferes with or adds to the duties of the engineer nor lessens his responsibility. The operation of the control as well as its design and construction is extremely simple and entirely free from the dangers and annoyances of mechanical and electrical complications.

The Miller Train Control

STAUNTON, VA. **DANVILLE, ILL.**

Steel for Service

This company makes different types of

Steel Cross Ties

suitable for all conditions in railroad construction.

The mark of quality CARNEGIE It protects the user

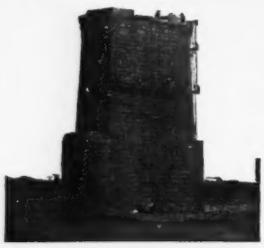
Carnegie Steel Company
General Offices—Pittsburgh, Pa.

826-A

Eliminate advertising and you reduce buying to its barest bread - and - butter basis.

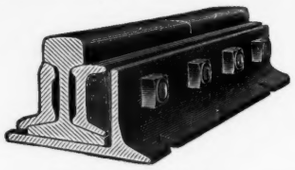
The Mo. Valley Bridge and Iron Co.
LEAVENWORTH, KANS.

Engineers, Manufacturers and Builders



of Bridges, Girders, Viaducts, Turntables, Trestles, Roofs, Steel Water Tanks for Buildings, Sub-structures, Pneumatic Piers, Deep Foundations, etc.

The Rail Joint Company
61 Broadway, New York City



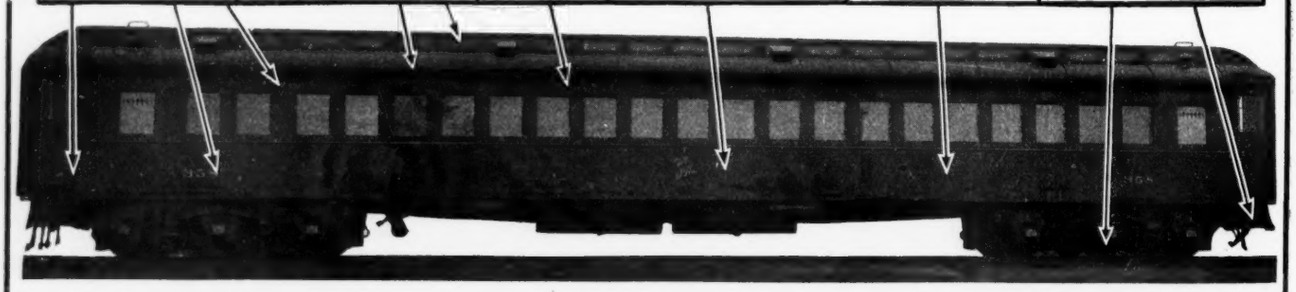
Weber Rail Joint
Continuous, Weber, Wolhaupter and 100% Rail Joints.
Standard—Insulated—Step—Frog and Switch
Protected by Patents.
Grand Prize, San Francisco, 1915

2

SHERWIN-WILLIAMS Paints and Varnishes

FOR PASSENGER COACHES

MODERN METHOD CAR PAINTING SYSTEM PRIMER SURFACER KNIFING COAT COLOR VARNISH	CAR ROOF PAINTS METAL ROOF PRIMER METALASTIC ROOF PAINT CANVAS ROOF PRIMER CANVAS ROOF PAINT	IMITATION GOLD FOR LETTERING	Q-D CAR BODY COLOR OLD DUTCH RY. ENAMEL ENAMELASTIC COLOR COATS	DURABLE RY. BODY VARNISH RAILWAY REXPAR	TRUCK AND PLATFORM ENAMEL



Follow this chart when specifying **PAINTS AND VARNISHES**

A complete line of Railroad Finishes for Passenger Coaches

THE SHERWIN-WILLIAMS CO.

Railway Paint and Varnish Makers **777 Canal Rd., Cleveland, Ohio**

"She's there on every count"

"I've been in the railroad game since a boy and I've climbed every rung of the ladder.

"I've seen the boys at the hand trucks work like horses to keep up with 'schedule pulls,' and I've seen 'em line up on pay day for practically all of the profits in freight handling.

"These were the conditions up to the time we installed the Lansing Train.

"Now we haven't a single trucker in the station. The forty-odd boys were replaced by that 'ere 'electric horse' and the string of trailers.

"The Lansing Train is a wonder for keeping things moving and lowering freight handling costs.

"**She's there** on every count.

"Come into my office and I'll give you some figures showing results before and after using the Lansing Train."

Now is a good time to get together on your proposition

LANSING COMPANY

"KEEP YOUR PRODUCT ON WHEELS"

Lansing, Mich.

CHICAGO NEW YORK BOSTON PHILADELPHIA KANSAS CITY MINNEAPOLIS SAN FRANCISCO

Shooting the Material into place by means of the

CEMENT-GUN

(Awarded Franklin Institute Medal)

gives a most compact and impervious structure, due to the tamping effect of the sand particles which are thrown at high velocity against the mass. This, however, is not the only automatic principle in forming "Gunite," as the selective principles also operate to give a uniform and compact mass.

Shooting the Material into place means economy, rapidity and many other advantages over the hand-applied method of placing concrete.

The Cement-Gun can be purchased outright from us and used by anyone, as it is not a restricted article.

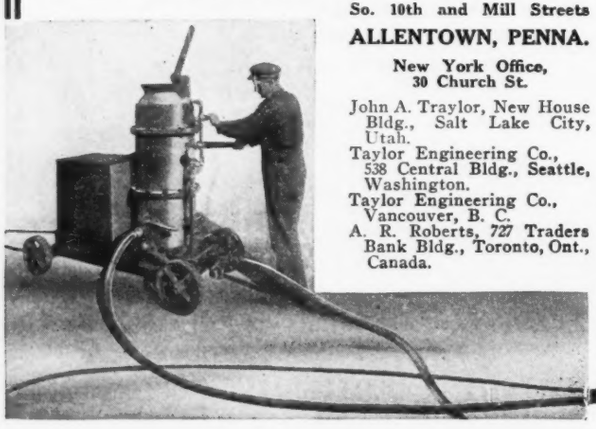
A Cement-Gun for Every Division means service and economy everywhere.

Let us acquaint you with the facts, figures and pictures of Cement-Gun work.

Cement-Gun Co. Inc.

So. 10th and Mill Streets
ALLENTOWN, PENNA.

New York Office,
30 Church St.



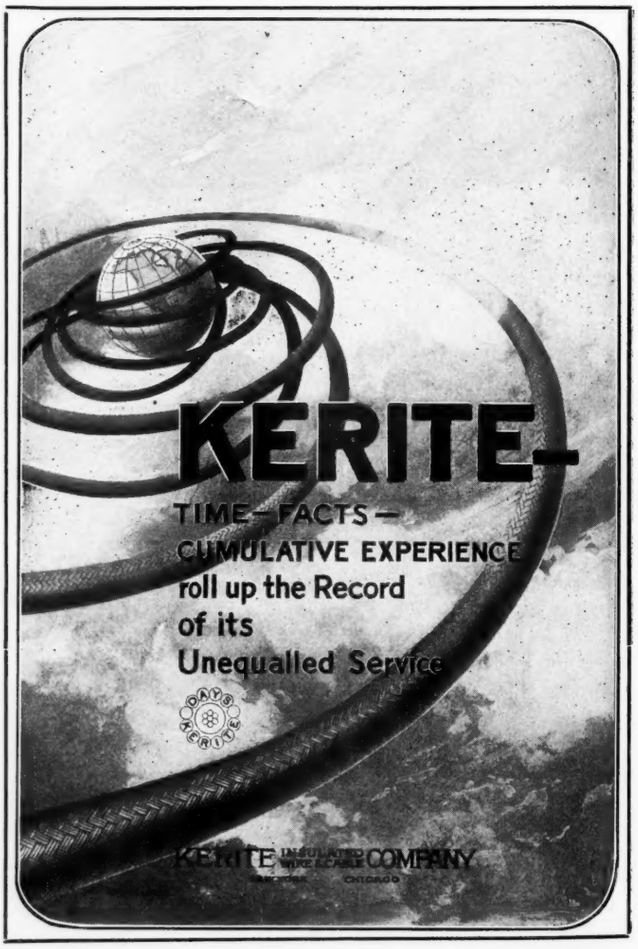
John A. Traylor, New House Bldg., Salt Lake City, Utah.
Taylor Engineering Co., 538 Central Bldg., Seattle, Washington.
Taylor Engineering Co., Vancouver, B. C.
A. R. Roberts, 727 Traders Bank Bldg., Toronto, Ont., Canada.

AN AUTOMATIC STOP
—with additional features—
—but without complications.

Brings the signal into the cab, prevents running red boards, keeps the speed below the prescribed limit thus reducing track maintenance and motive power upkeep expense.

Write for details.

Julian-Beggs Signal Co., Terre Haute, Ind



95%

of the

STEAM RAILROAD EQUIPMENT

in the

UNITED STATES, CANADA and MEXICO
is equipped with Chilled Iron Wheels.

Their moderate initial cost and low maintenance cost make them an economical wheel to use.

All of our foundries are equipped for turning axles, boring and mounting wheels.

GRIFFIN WHEEL COMPANY

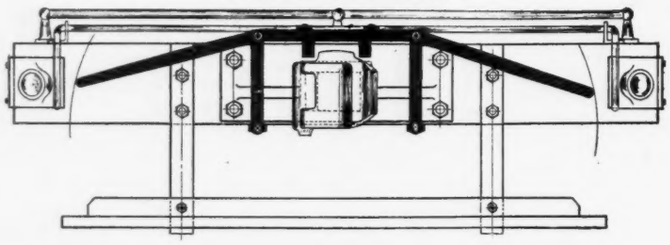
McCormick Building Chicago, Ill.

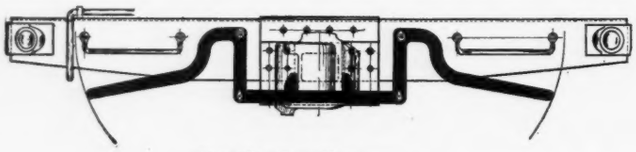
Foundries

Chicago Detroit Tacoma Denver Kansas City St. Paul Los Angeles Boston

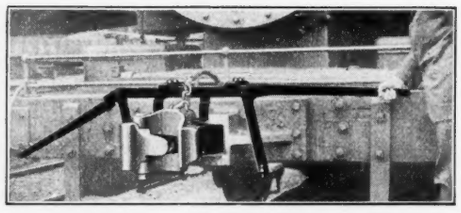
Safety Always For Train Service Employes Coupler Centering And Adjusting Device

Front End Locomotive

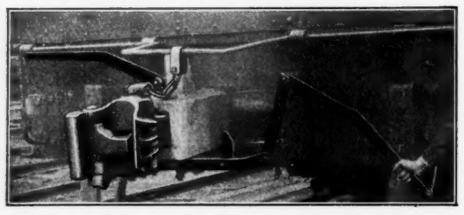




Freight Car Equipment



Front and Rear Locomotive Equipment



Tested and found satisfactory by 18 months' actual hard service.

Adjusts coupler to meet opposing coupler without requiring train to stop, or compelling trainmen to go between cars to handle or kick the coupler. Prevents many accidents to train service employes.

Adjusts coupler from side of car, platform of car, platforms of new type switching engine, or from top of car if required.

Saves men, time, wear and tear, angle cocks, couplers and shop repairs, compensation and damage claims.

Design is simplicity itself, easily applied, easily removed, easily repaired.

Does not interfere with any type of cutting gear, air or steam hose connections, or drop bottom levers or mechanism. Can be applied to adjust any type of coupler on any type of car, or locomotive.

For full particulars as to price, design, etc., address

Oliver Iron & Steel Company

Pittsburgh **Pa.**

Also Manufacturers of

Machine Bolts
Track Bolts
Screw Spikes

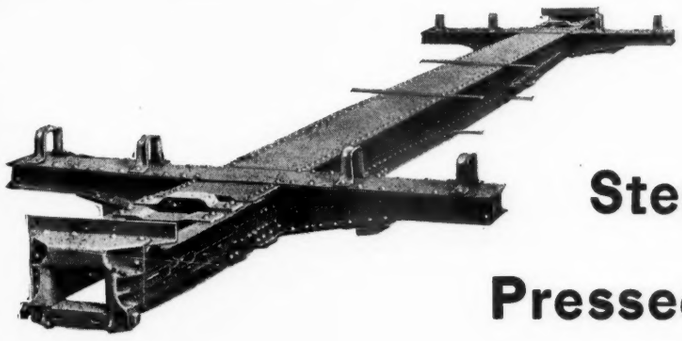
Picks

Carriage Bolts
Crow Bars
Drop Forgings

Forgings for Railway and General Use
Concrete Reinforcing Bars
Telegraph and Telephone Pole Line Material.

USE
Camel-Gilroy Car Doors
OR
Car Door Fixtures
FOR
BOTTOM HUNG CAR DOORS
ALL STEEL OR STEEL BOUND DOORS
DOUBLE OR SINGLE SHEATHED CAR

CAMEL COMPANY
332 So. Michigan Blvd.
CHICAGO, ILL.



Forgings
Steel Underframes
Pressed Steel Shapes

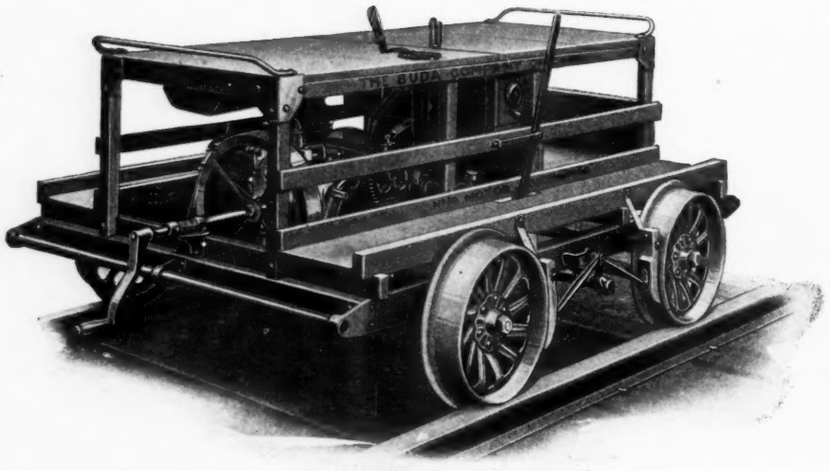
RYAN CAR CO.
Car Repair Specialists
Wood and Steel Cars

GENERAL OFFICES
332 So. Michigan Blvd., Chicago

WORKS
Hegewisch, Chicago

Buda No. 19 Motor Section Car

Safety First Always



The experience of a great many of the largest Trunk Lines with Motor Section Cars has proven that the best is the cheapest in the end, and the first cost of a Motor Car is the last consideration. Efficiency, Durability, Safety and Economy in operation is what every Railroad Officer is endeavoring to secure for his road.

The Buda No. 19 Motor Section Car has a Free Running Engine.

The Engine is started by cranking, without pushing the car.

Car cannot be run over Twenty Miles per hour.

Car can be run at any speed, from one to twenty miles per hour, at the will of the operator.

Car can be operated up to twenty miles per hour or at slow speeds for grades with heavy loads without decreasing the full horsepower of the engine, being practically a combined Passenger and Freight Locomotive type of car for any condition of grades and loads.

NEW YORK
30 Church Street

The Buda Company
Railway Exchange Building, Chicago

ST. LOUIS
113 No. 2d Street

They Are Alike in Name Only

A POOR cigar and a good cigar are alike in name only—"cigars." The true comparative value can only be determined in the smoking.

So it is with dust guards; a poor dust guard and a good dust guard are alike in name only—"dust guards." While Virginia Compound Compensating Dust Guards bear the name "dust guards," they are totally different in principle and quality from ordinary dust guards.

To serve the purpose intended, a dust guard must necessarily rest upon the axle. With a common wood guard, as wear occurs, it rests upon the ***top*** of the axle —leaving an opening ***beneath*** the axle. It is through this opening that dust, dirt, grit, etc., enter the journal box, ***and there is no way this opening can be prevented excepting by the use of a compensating type of dust guard.***

The compensating device of Virginia Dust Guards insures a positive, dust proof, resilient contact with the axle, at each and every point of the axle periphery taken. Being concealed, there is no possibility of becoming damaged or jamming by dirt, grease or waste. Due to the grain of the wood, the common wood dust guards soon warp, crack and split, even before they get into service.

Virginia Dust Guards are built up of layers of wood with the grain running in opposite directions—cemented and riveted together under hydraulic pressure. That is why they cannot warp, split or crack. Even with a chisel, you cannot split them.

We have just published a new booklet which gives many facts and figures on the dust guard question that will interest every operating official.

VIRGINIA EQUIPMENT COMPANY

Makers of Railway Equipment

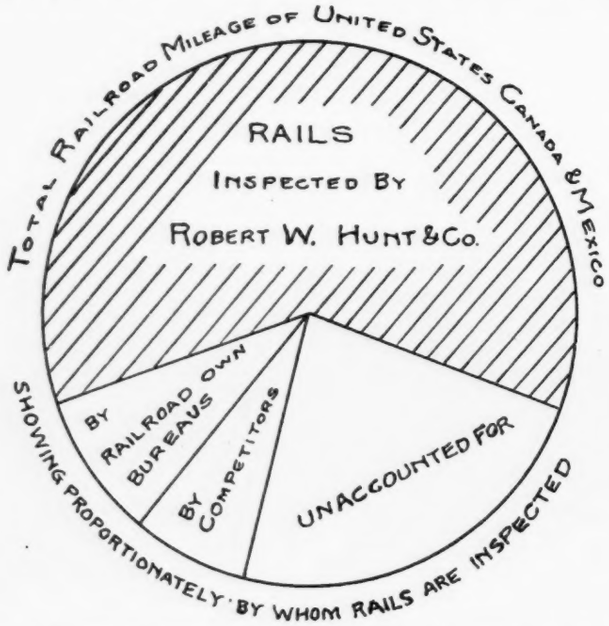
General Office
Toledo, Ohio

Factory Office,
Oak Harbor, Ohio

EASTERN REPRESENTATIVE
Mechanical Specialties Co., Park Row Bldg., New York

Bureau of Inspection

Rail Failures Were Reduced 40%


TOTAL RAILROAD MILEAGE OF UNITED STATES CANADA & MEXICO
RAILS
INSPECTED BY
ROBERT W. HUNT & CO.
BY RAILROAD OWN BUREAUS
BY COMPETITORS
UNACCOUNTED FOR
SHOWING PROPORTIONATELY BY WHOM RAILS ARE INSPECTED

Trunk Lines Employing Hunt Special Inspection

The following trunk lines, with their mileage shown, are among those for whom we inspect rails:

*Atchison, Topeka & Santa Fe	11,317	*International & Great Northern	1,160
Atlantic Coast Line	4,447	Kansas City, Mexico & Orient	737
*Boston & Maine	2,314	*Louisville & Nashville	5,037
Canadian Government Rys.	4,025	Maine Central	1,220
*Canadian Northern	9,240	*Minneapolis, St. Paul & Sault Ste. Marie	4,229
*Canadian Pacific	12,917	Missouri, Kansas & Texas	3,865
*Chesapeake & Ohio	2,371	*Missouri Pacific System	7,293
*Chicago & Alton	1,052	*Nashville, Chattanooga & St. Louis	1,231
*Chicago & Eastern Illinois	1,136	National Rys. of Mexico	6,468
*Chicago & Northwestern	8,423	New York, Ontario & Western	568
*Chicago, Burlington & Quincy	9,366	*Oregon Short Line	2,259
*Chicago, Indiana & Louisville	622	*Oregon, Washington R. R. & Navigation Co.	2,027
*Chicago, Milwaukee & St. Paul	10,205	Pennsylvania Lines West of Pittsburgh	3,238
*Chicago, St. Paul, Minneapolis and Omaha	1,753	*St. Louis & San Francisco	4,749
*Colorado & Southern	1,089	*Seaboard Air Line Ry.	3,454
*Delaware & Hudson	880	*Southern Pacific System	11,758
El Paso & South Western System	1,027	Texas & Pacific	1,943
*Erie	2,257	*Union Pacific	3,618
Florida East Coast	745	*Wabash	2,519
*Grand Trunk Pacific	2,748	*Yazoo & Mississippi Valley	1,382
*Grand Trunk System	4,790		
*Illinois Central	4,767		

Those marked * mean that Special Inspection is performed on all the orders for those roads.

Every railroad man is interested in a means to prevent rail failures and is naturally ready to get the kind of co-operation which will prevent defective rail from being laid on the track.

Here is the answer to your question as to what value lies in Special Inspection:

Statistics received by the American Railway Engineering Association from the various railroads of the United States and Canada for year ending October 31, 1915, make it possible to classify rails known to have been rolled under Special Inspection from those rolled without Special Inspection. A closer classification shows the total number of failures per 100 track miles, with and without Special Inspection.

Of all rails reported from the United States mills that have been rolled under Special Inspection there have been 19.6 failures per 100 track miles, as against 27.4 failures on rails to which Special Inspection did not apply.

Special Inspection Reduced Rail Failures 40%

The cut to the left shows graphically the extent to which Hunt Rail Inspection applies to the total mileage of the railroads of the United States, Canada and Mexico. Thus you will see that of the total mileage, sixty-one per cent is regularly inspected by our Bureau of Inspection.

We are the originators of Special Inspection, and our Bureau of Inspection, since its inauguration in 1912, has inspected under this system, over 4,500,000 tons of rail.

Robert W. Hunt & Co.

Robert W. Hunt Jno. J. Cone Jas. C. Hallsted D. W. McNaugher

Tests and Consultation

"THE OVERLAND LIMITED" OF THE UNION PACIFIC RAILROAD

Running 2275 miles between Chicago and San Francisco over rails inspected by Robert W. Hunt & Co. All the equipment except the Pullman sleepers also inspected by Robert W. Hunt & Co.

Hunt Special Inspection covers the steel from the open hearth furnaces or converters to the finished rails and thus includes careful inspection by experienced men of all operations, such as casting the ingots, their stripping and treatment in the soaking pits, the discard, rolling the section and finally each rail is subjected to the scrutiny of trained final inspectors.

Improvements Inaugurated by Special Inspection

The following are selections from various testimonials on benefits received from Hunt Special Inspection:

1—"Everybody throughout the mill is up on his toes when the mill is on an order subject to Robert W. Hunt & Company's Special Inspection."

2—"It is a great saving to the manufacturer, as the percentage of loss is much less, due to better work and a better grade of steel being obtained."

3—"In my estimation a marked improvement is noted both in mill practice and also our own methods of inspection in the four years since Special Inspection was introduced."

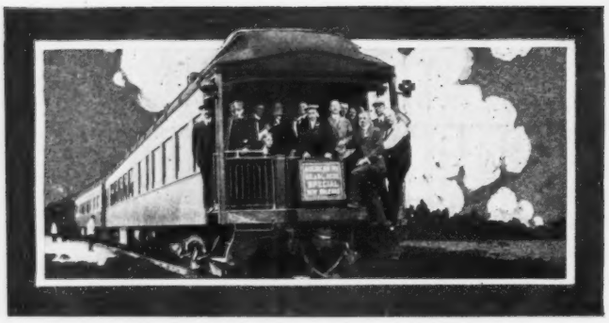
4—"Special Inspection has been a great help to final inspection."

5—"The workmen know that there is some one who understands the work watching them and they do better work, and we seldom see a heat too hot or too cold."

6—"Special Inspection has done a lot at the open hearth furnaces and the Bessemer Converters —'messes' have been eliminated."

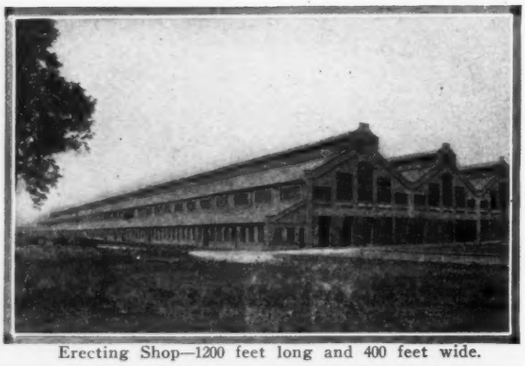
WRITE FOR BOOKLET DESCRIBING OUR SERVICE FOR YOUR MAINTENANCE OF WAY DEPARTMENT

2200 Insurance Exchange, CHICAGO 90 West Street, NEW YORK Monongahela Bank Building, PITTSBURGH
Charleston Building, SAN FRANCISCO Syndicate Trust Building, ST. LOUIS
McGill Building, MONTREAL Norfolk House, LONDON



PULLMAN

Freight Car Con
Of Our M



Erecting Shop—1200 feet long and 400 feet wide.

Power House.

End view of Erecting Shop. Truck Shop on right.

THE Pullman reputation as quality car builders applies to freight cars as well as to passenger cars.

The manufacturing plant covers an area of approximately 400 acres, on which are located over 100 buildings, served by over 100 miles of track within the shop enclosure.

The excellence and convenience of Pullman passenger cars are well known to the traveling public in all sections of this country as well as in many foreign countries.

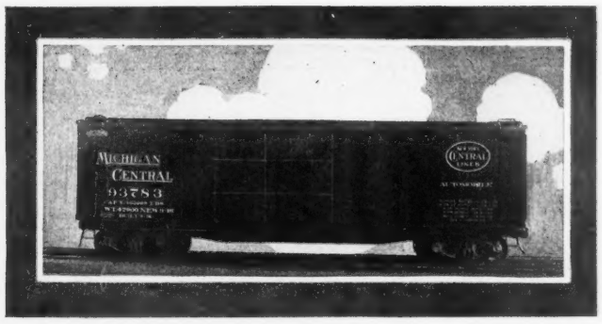
In later issues we shall take up the various details of construction which contribute to Pullman Passenger Car Service.

But the purpose of this advertisement is to show by illustrations and figures how well we are equipped to give Pullman Service in our Freight Car Department.

Pullman Passenger Cars

THE PULLMAN CO

SERVICE



struction Is One ain Issues

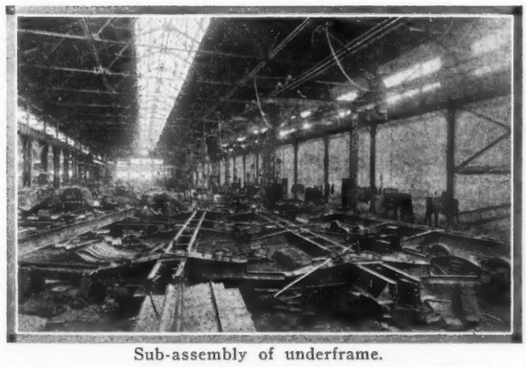
OUR new and reconstructed Freight Car Shop buildings and yards cover 135 acres.

These buildings house the most modern steel working machinery for building all-steel and steel super-structure freight cars.

Our freight cars, like our passenger cars, are in use in every section of the country. Our service experience gained as large operators of passenger cars is at the service of railroads at all times.

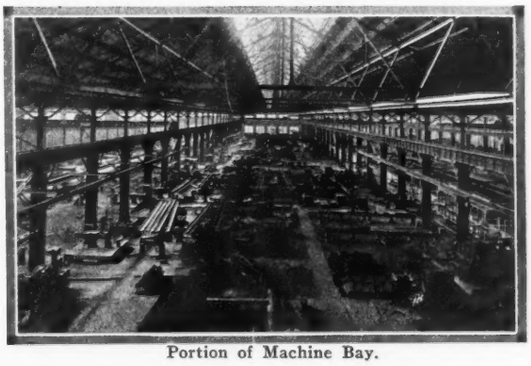
Every car that leaves the Pullman Shops is strictly in accordance with specifications and is often built at considerable savings due to suggestions which are based on our wide experience.

Freight car construction is one of our main issues, but the most important of all issues is Pullman Reputation.



Sub-assembly of underframe.

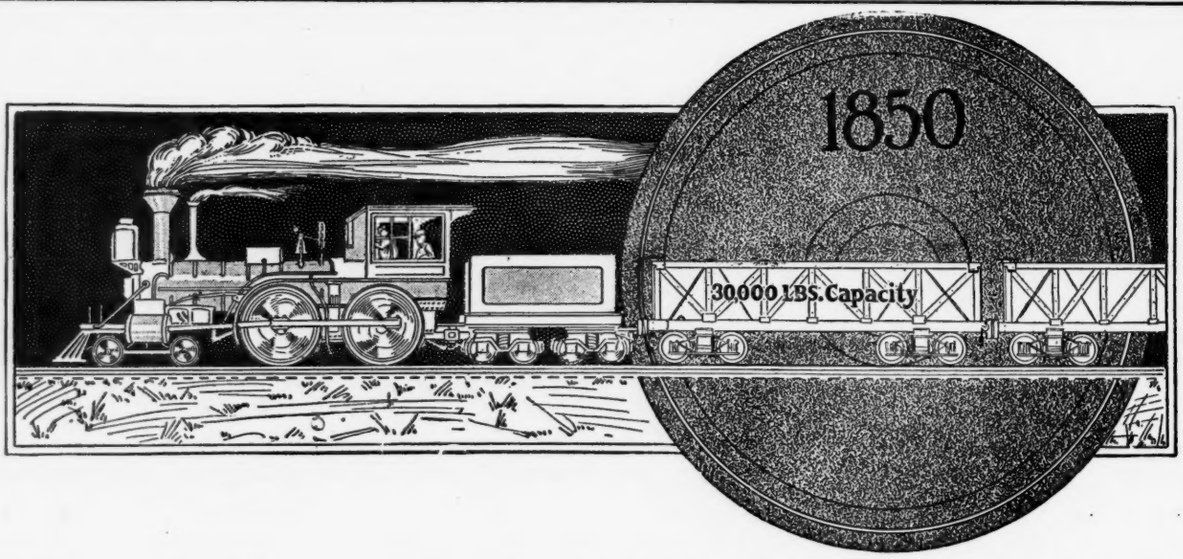
Portion of Track System.



Portion of Machine Bay.

MPANY CHICAGO, ILL.

Pullman Freight Cars



The Wonderful Single Service Chilled Iron Wheel

Single Service means when a wheel is applied to a car it is allowed to run its life without any repairs whatever.

No Shop Investment in expensive lathes is required for re-turning, which is the case with other types of wheels.

And the Manufacturers are so confident of the performance of the Chilled Iron Wheels that ordinary freight car wheels are guaranteed to yield a minimum service of

6 years for 625 lb. M. C. B. Wheels
5 years for 675 lb. M. C. B. Wheels
4 years for 725 lb. M. C. B. Wheels

The actual guaranteed cost to the railroad per year for a 625 lb. M. C. B. Wheel is one-sixth of the cost price, less the scrap value of the old wheel, which is accepted as part payment for the new wheel.

The Master Car Builders Inter-change rules base the cost of renewals upon the following:

	Chilled Iron	Other Types
Cost of New Wheel	$9.00	$19.50
Less average scrap credit price	4.75	4.50
Net	$4.25	$15.00
Interest @ 5% for one year	.21	.75

Difference in interest in favor of Chilled Iron Wheel 54 cents.

As the average service of Chilled Iron Wheels is from fifty to seventy-five per cent greater than the guarantee it will be seen that the increased interest charges alone of other types of wheels will more than absorb the renewal cost of the Chilled Iron Wheel.

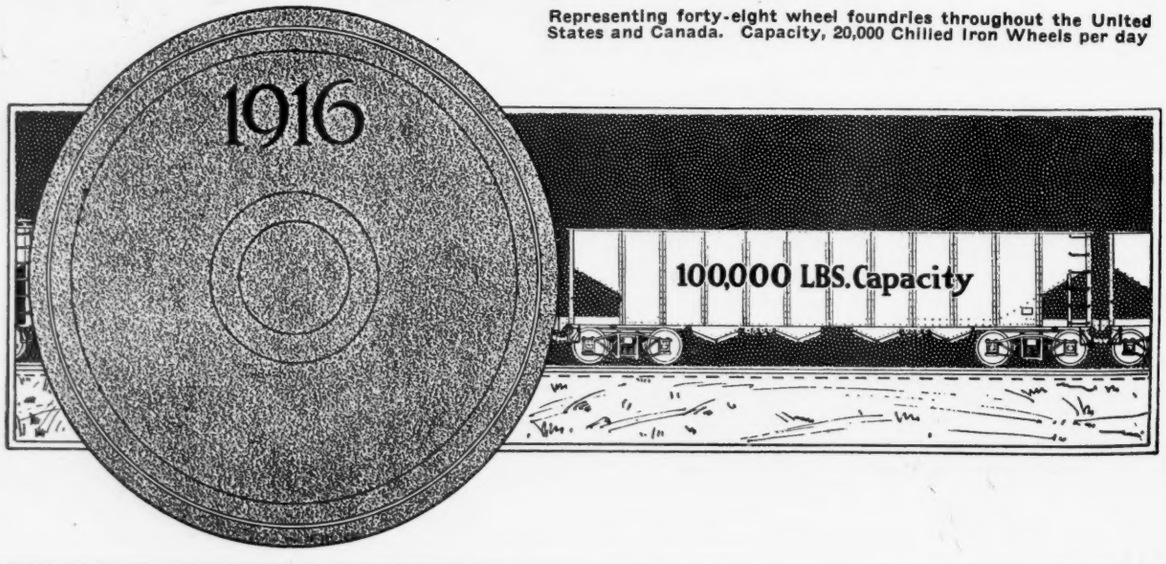
Ninety-seven per cent of the freight cars in use are equipped with Chilled Iron Wheels and service measures the standards.

25,000,000 now running

Association of Manufacturers of Chilled Iron Wheels

1228 McCormick Building, Chicago, Illinois

Representing forty-eight wheel foundries throughout the United States and Canada. Capacity, 20,000 Chilled Iron Wheels per day



ASK THE MAN THAT OPERATES THEM HE KNOWS

"UNDER-FRAME"

"—AND FURTHERMORE THIS SPRING IS—WHAT DOES IT. THE SAFETY PEOPLE—HAVE GIVEN US A LIGHTER EQUIPMENT: ONE THAT WORKS RIGHT AT ANY TRAIN SPEED ON STRAIGHT OR CURVED TRACK—AND WITHOUT COMPELLING OUR MEN TO ADJUST THE BELT TENSION."

...E SAFETY CAR HEATING & LIGHTING CO.

2 RECTOR ST., NEW YORK, N.Y.

ST. LOUIS
MONTREAL
SAN FRANCISCO

THE GRIP OF THE HUMAN HAND WITHOUT FATIGUE

SAFETY SHADE HOLDER

No 19032 ONE OF THE SAFETY SHADE HOLDER CAR LIGHTING FIXTURES

150,000 IN SERVICE
ASK THE MEN
THAT OPERATE THEM.

THE SAFETY CAR HEATING & LIGHTING CO.
NO. 2 RECTOR STREET, NEW YORK CITY.

CHICAGO
BOSTON
PHILADELPHIA
ST. LOUIS.
MONTREAL
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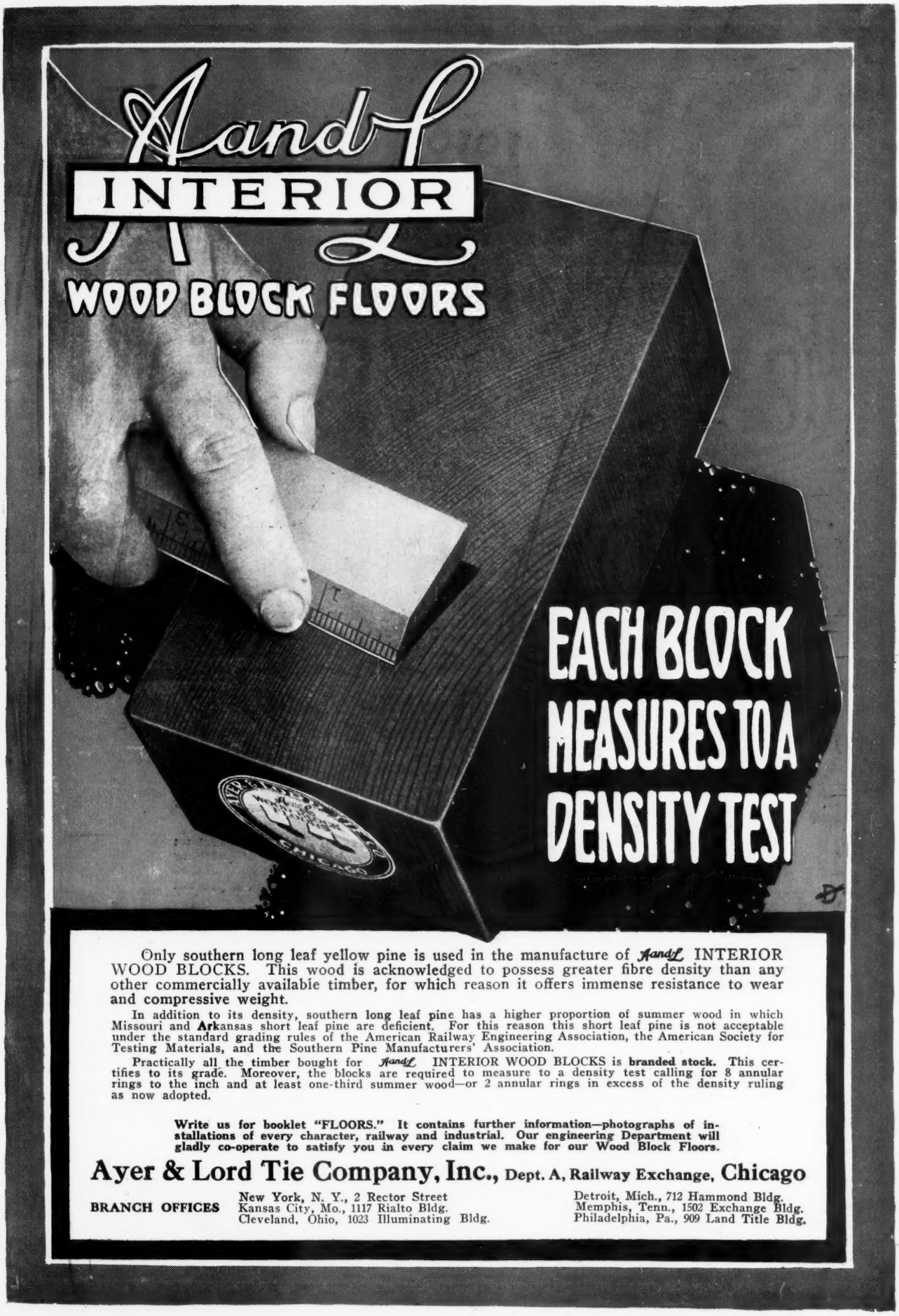


Only southern long leaf yellow pine is used in the manufacture of A and L INTERIOR WOOD BLOCKS. This wood is acknowledged to possess greater fibre density than any other commercially available timber, for which reason it offers immense resistance to wear and compressive weight.

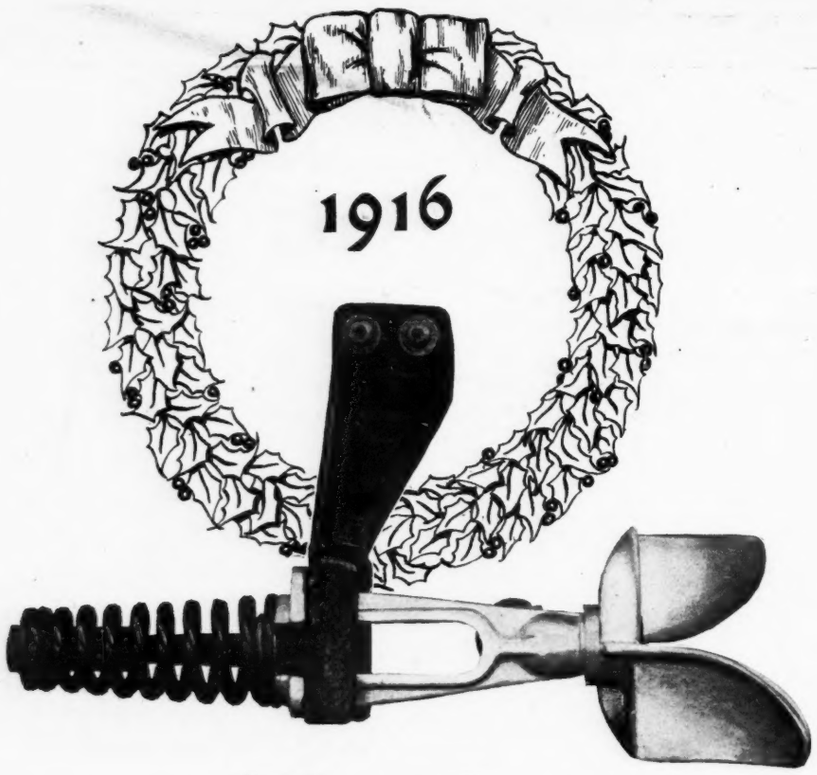
In addition to its density, southern long leaf pine has a higher proportion of summer wood in which Missouri and Arkansas short leaf pine are deficient. For this reason this short leaf pine is not acceptable under the standard grading rules of the American Railway Engineering Association, the American Society for Testing Materials, and the Southern Pine Manufacturers' Association.

Practically all the timber bought for A and L INTERIOR WOOD BLOCKS is **branded stock.** This certifies to its grade. Moreover, the blocks are required to measure to a density test calling for 8 annular rings to the inch and at least one-third summer wood—or 2 annular rings in excess of the density ruling as now adopted.

Write us for booklet "FLOORS." It contains further information—photographs of installations of every character, railway and industrial. Our engineering Department will gladly co-operate to satisfy you in every claim we make for our Wood Block Floors.

Ayer & Lord Tie Company, Inc., Dept. A, Railway Exchange, Chicago

BRANCH OFFICES New York, N. Y., 2 Rector Street
Kansas City, Mo., 1117 Rialto Bldg.
Cleveland, Ohio, 1023 Illuminating Bldg.
Detroit, Mich., 712 Hammond Bldg.
Memphis, Tenn., 1502 Exchange Bldg.
Philadelphia, Pa., 909 Land Title Bldg.



Timely

MODERN railroading has reached that point in its development where automatic equipment, in many instances, has become a necessity. The gradual elimination of the human element has redounded to the advantage of railroads not only in immediate savings, but in safety and higher efficiency.

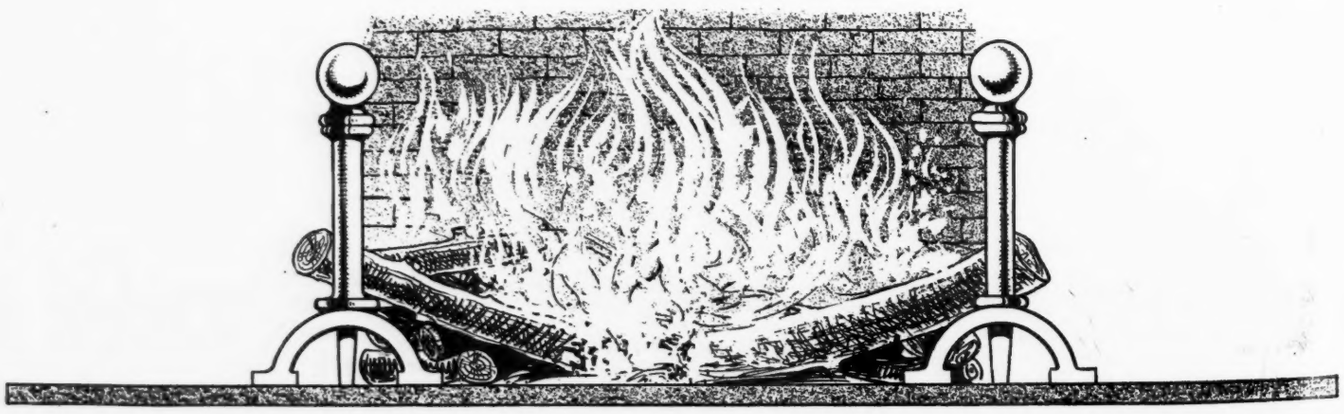
For example, take the modern steel car, freight or passenger. Its coupling equipment is entirely automatic—except the connection between train pipe hose. Here we still have to depend upon the human element; here time-wastes lurk, and maintenance costs are ever present.

The Robinson Connector is a real step forward in coupling train pipe hose; it's a further step to greater efficiency, lower maintenance costs, increased safety.

In this day of rapid transit, heavy trains and congested yards, the Robinson Connector is timely in that its use facilitates the making up and dispatching of trains, lessens train detentions, cancels the coupling of hose by hand, insures a tight train line, and costs almost nothing to maintain. Compare your present method with the Robinson Connector.

THE ROBINSON CONNECTOR COMPANY

BRANFORD, CONN.



New Economies

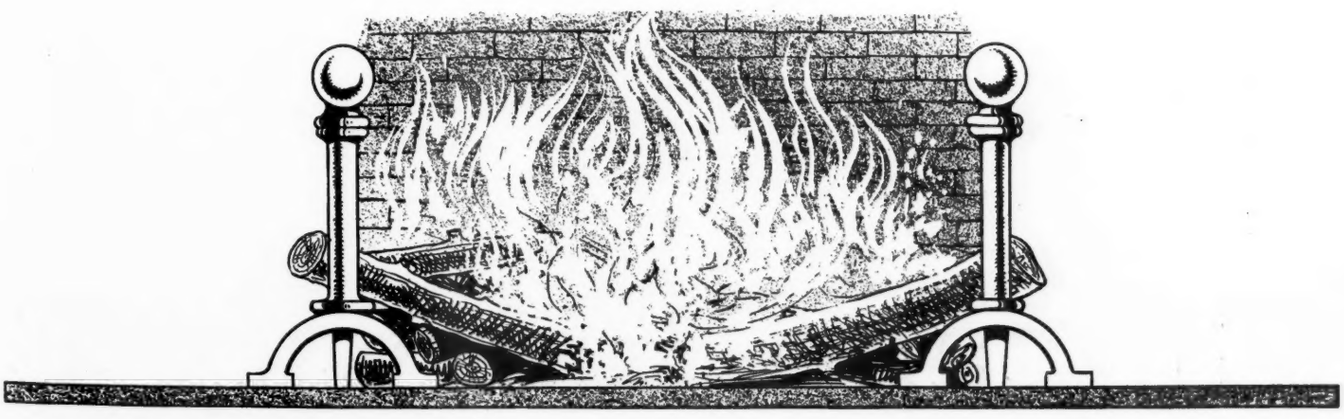
THROUGHOUT every year in business, search continues for means toward new economies. In railway work, especially, the tendency is toward investigation and use of practical devices which increase efficiency and add to economy.

The Robinson Connector is essentially one of these devices. It is economically advantageous—it is mechanically an impressive improvement over the present system. The use of the Robinson Connector insures maximum hose life, a higher train line efficiency, a lower train line maintenance cost and the complete elimination of human effort in the manipulation of hose.

Upon the lines of the Canadian Northern and the Canadian Pacific Railways the Robinson Connector has made more than 600,000 troublous miles, establishing economies unexpected and requiring no maintenance attention whatever. That it should be considered as a basis for new economies is not, therefore, a statement predicated on theoretical assumption, but one substantiated by actual performance.

THE ROBINSON CONNECTOR COMPANY

BRANFORD, CONN.



Apply the Brakes

THIRD

POINT SUPPORT

Brake Beams—improperly hung are Expensive and Unsafe

They allow the shoes to drag and retard movement of the train.

They wear brake shoes unevenly.

They reduce shoe bearing area offered to wheel.

Safety chains are expensive, ineffective and totally inadequate.

REO

Chicago Railway Eq

to Brake Expense

THIRD

POINT SUPPORT

"The "CRECO" Third Point Support is the Logical Remedy

The Creco Support assists in brake release, and by so eliminating contact, reduces train resistance 10% or more.

The Creco Support carries shoes in desired relation to the wheels at all times and so prevents uneven shoe wear.

The Creco Support by preserving full frictional area of shoes, assures brake mechanism an opportunity to do its fullest work.

The Creco Support is a highly efficient safety device, making safety chains unnecessary.

RE

uipment Co.

McCormick Bldg.
Chicago, Ill., U.S.A.

Standard Heat & Ventilation Co., Inc.
HEATING APPARATUS FOR RAILWAY CARS AND LOCOMOTIVES
CAR VENTILATORS 165 BROADWAY, NEW YORK STORAGE BATTERY CHARGING PLUGS AND CAR RECEPTACLES

CAR LIGHTING
THE SAFETY CAR HEATING AND LIGHTING CO.
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Montreal Boston San Francisco

PARKESBURG
The IRON that made the CHARCOAL TUBE famous
THE PARKESBURG IRON COMPANY
PARKESBURG, PA.

AXLES
FOR PASSENGER OR FREIGHT CARS AND LOCOMOTIVES
"Pollak" Special Heat Treated Steel. Open Hearth—Nickel or Vanadium Steel

FORGINGS
MARINE MACHINE AND ENGINE
From 10 lbs. to 100,000 lbs. each of every shape and Description.

THE POLLAK STEEL CO., Cincinnati, O.

MASON SAFETY TREADS—prevent slipping and thus obviate damage suits.
KARBOLITH CAR FLOORING—for steel cars is sanitary, fireproof and light in weight.
STANWOOD STEPS—are non-slipping and self-cleaning.
Above products are used on all leading Railroads. For details address
AMERICAN MASON SAFETY TREAD CO.
Main Offices: Lowell, Mass. Branch Offices: Boston, New York City, Philadelphia, Chicago, Washington, Kansas City, Cleveland, St. Louis.

Roller Center and Side Bearings
EDWIN S. WOODS & CO., McCormick Bldg., Chicago
50 Church Street, New York

MULE-HIDE PRODUCTS
MULE-HIDE Plastic Car Roofing.
MULE-HIDE Waterproof Canvas for roofs of Passenger Coaches, Cabooses and Cabs.
PER-BONA Insulating Paper for Refrigerator Cars.
MULE-HIDE Fabric, membrane for Waterproofing Concrete Construction.
MULE-HIDE Roofing for Railroad Buildings, etc.
THE LEHON COMPANY, W. 45th Street and Oakley Ave. CHICAGO

"WAYCOTT"—"DAMASCUS"—"ANGLROD"
BRAKE BEAMS
"BRASCOTT" CAR LADDERS
THE DAMASCUS BRAKE BEAM CO.
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RAILWAY UTILITY CO.
Sole Manufacturers
"Honeycomb" and "Round Jet" Ventilators
for Monitor and Arch Roof Cars, and all classes of buildings; also
"Electric Thermometer Control"
of Car Temperatures.
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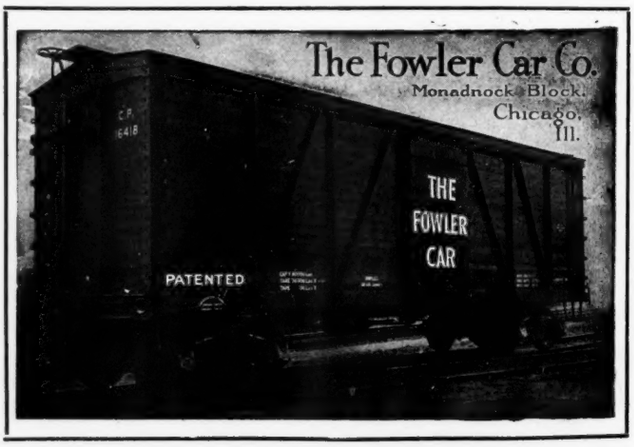
1328 BROADWAY New York, N. Y.

DUNER CAR CLOSETS
Enameled Iron Wet or Dry Closets
DUNER CO.
101 S. CLINTON STREET, CHICAGO.

Standard Steel Platform
In Use by 281 Companies
Sessions-Standard Friction Draft Gear
In Use by 205 Companies
Both Made by the
Standard Coupler Co., 30 Church St., New York

BARBER TRUCKS
CENTER PLATES & SIDE BEARINGS
Will relieve Wheel Flange and Coupler Knuckle wear, also any wear on Journal Bearings.
STANDARD CAR TRUCK CO.
McCormick Bldg., Chicago



"Millions Saved to Railroads"

Light on Freight Pilfering Losses

Your pilfering losses are piling up most astonishingly, and now run into millions yearly. Just think of it! Millions now paid out annually in claims for pilfering, concealed losses, damages, etc.

You Can Prevent This Waste

By making it profitable for shippers to adopt the

PNEUMATIC COLLAPSIBLE METAL SHIPPING CASE

(Absolutely Pilfer-Proof)

"Transforms Waste Into Profits"

Provides Perfect Protection against Pilfering, Damage in transit, etc. Carriers can never compel shippers to use a case offering this protection without recognizing the benefits accruing to the carriers, and so equalizing the rates that the shipper is encouraged to use a case offering this protection by reason of its economy to himself.

The universal use of this case will save to railroads millions of dollars, now paid out in claims for pilfering, concealed losses, damages, etc.

Carriers may secure these millions by simply increasing their coal bill $300,000. This amount will furnish the power necessary to carry the additional weight free and equal to the wooden box.

Why not let us demonstrate this case to you?

PNEUMATIC SCALE CORPORATION, LTD.
NORFOLK DOWNS, MASS.

NEWMAN

Long Leaf Yellow Pine for All Parts of Freight Cars

WHEN it is considered that a locomotive will handle as easily one hundred cars weighing (empty) 30,000 pounds each, as it will fifty cars (empty) weighing 60,000 pounds each, then you will appreciate the enormous saving in railroad operation by building cars of carefully selected lumber—"Newman" Long Leaf Yellow Pine.

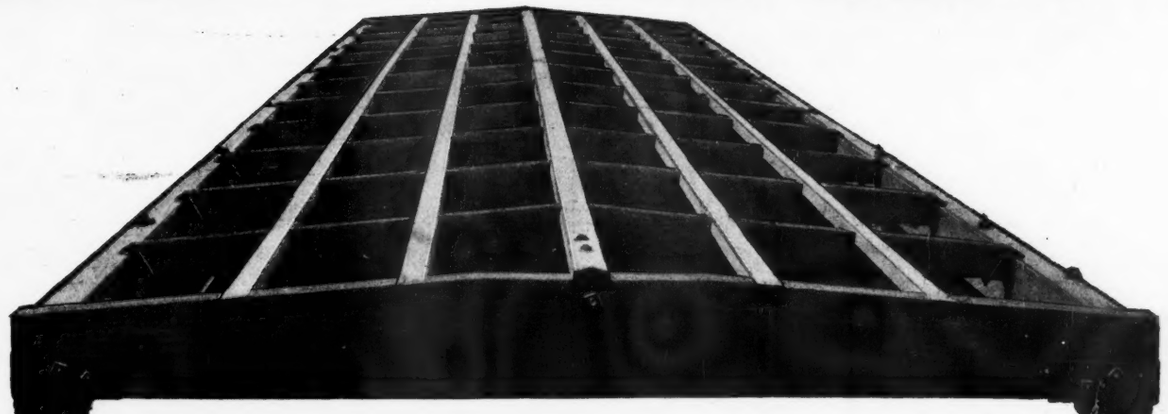
The weight and capacity of a car has nothing to do with its strength in train service, provided the center construction and that part which takes the pulling and buffing strain is built on scientific principles.

The tidal wave of lumber substitutes, which has swept the country, has now rolled back and properly graded lumber is being used in all parts of freight cars. "Newman" Long Leaf Yellow Pine can be used with as much certainty for the various types of freight cars as wood substitutes, and you have the advantage of low first cost, low operating cost, low maintenance, and quick deliveries.

Every Stick Branded

Notice The Brand and

BRANDED LUMBER



"Newman" Backbone Stands the "Gaff"

THE "Newman" Service is distinctive because the buyer can rely on the quality of lumber in every inch of every stick. The backbone is there and all irregularities are eliminated before the lumber leaves our mills.

Every stick is branded with the word "Newman," therefore, when you specify "Newman" Brand, notice the brand and see that it's "Newman." Lumber coming from the same section is not "Newman" quality, because our selections are made from a definitely restricted area. Our mill inspectors are more exacting than required by the Density Rule and when "Newman" Branded Lumber leaves our mill there is no doubt about quality.

We always have large stocks on hand for immediate shipment, but if for any reason we cannot ship your order when specified, we will not take the contract.

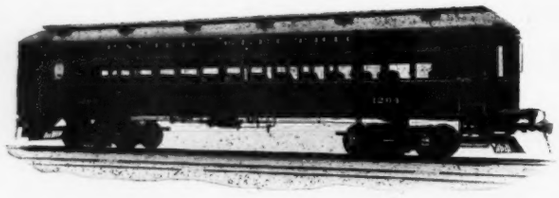
Write, wire or 'phone for anything in Long Leaf Yellow Pine.

J. J. Newman Lumber Co.
Hattiesburg, Miss.

See That It's NEWMAN

Pressed Steel Car Co.

New York, Pittsburgh, Chicago, St. Paul



All-Steel Electric Railway Car

First for safety and traffic promotion. Built for speed and comfort.

Seating Capacity 60 passengers.

If interested write for full particulars.

4

BRAKE SHOES

The "Improved Perfecto" Driver Shoe gives Maximum Efficiency and is undoubtedly the Safest, Best and Cheapest Shoe for Locomotive Service.

MADE ONLY BY

AMERICAN BRAKE SHOE & FOUNDRY CO.

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Selling Agents for: Dunham Hopper Door Device—Feasible Drop Brake Staff—Columbia Lock Nut—Anglo-American Varnishes—Collapsible Stake Pocket—Paints and Enamels—Kelly Brake Jaw—Electric Arc Welders—Injector Sand Blast Apparatus—Linofelt—Fibrofelt—Lith.

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Special Agents for C. & C. Electric & Mfg. Co.
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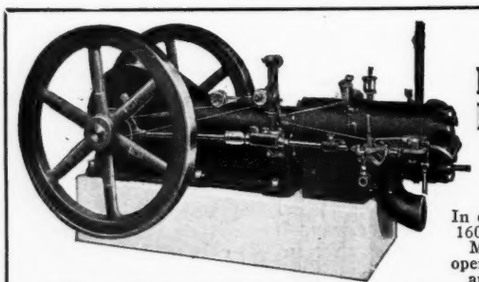
Special Agents for Holden & White
Johnson Fare Box Co.



GIANT FUEL OIL ENGINES

Single or Duplex

In capacities 12 to 160 Horsepower. Made also to operate on gas and gasoline.

"Chicago Pneumatic" Simplate Valve Compressors are built in over 300 sizes and styles for operation by steam, belt, short belt with idler, gasoline or fuel oil engine, or direct motor drive in capacities up to 5,000 cu. ft. of free air per minute.

Send for Bulletins.

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Operate Easily
Throw the Knuckle Positively
Lockset Efficiently
Have a Dependable Lock-to-Lock
TOP, BOTTOM AND SIDE OPERATED.

The same Knuckles, Locks and Knuckle Pins for all three types.

THE NATIONAL MALLEABLE CASTINGS CO.

Cleveland Chicago Indianapolis Toledo
Sharon, Pa. Melrose Park, Ill.

THE GOODWIN STANDARD CLASS "G" CONSTRUCTION AND BALLASTING CAR

AIR DUMPING AND AIR REPLACING

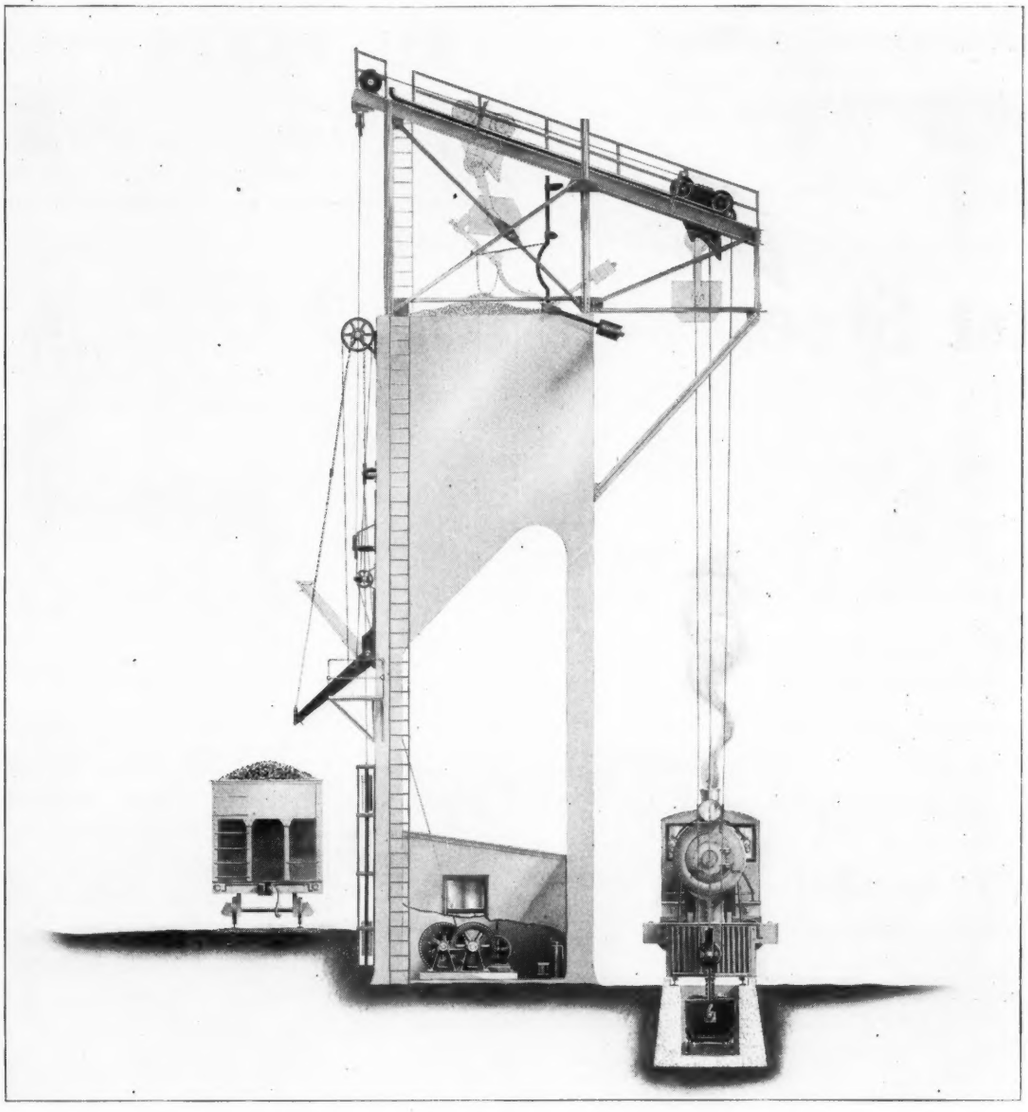
Write for Illustrated Catalogue on

DIRT MOVING UP-TO-DATE

Cars Leased or Sold

GOODWIN CAR COMPANY, 17 Battery Place, New York 1524 Otis Building, Chicago

Cinder Handling and Storage Plant on Pittsburg and Lake Erie R. R.



Recently completed by us for this R. R. at College, Pa., and Newell, Pa.
Also two more under contract for use at Aliquippa and Monessen, Pa., for the same company.

Six heavy solid cinder buckets, 55 cubic feet capacity each, located in Cinder Pit on heavy roller trucks. Electric hoist with automatic stop lifts loaded bucket which dumps automatically into storage bin, at any time.

The Reinforced Concrete bin, lined with fire-brick, holds cinders until empty cars are available and cast iron gate controls flow of cinders from bin.

We try to be unique
in the characteristics which make a fact of the phrase,
"Fullfill the Contract,
Satisfy the Client"

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ROBERTS AND SCHAEFER CO.
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Glass Constructions NY
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Roof lights, Sky-lights and Vault-lights for Train-sheds, Stations, Round-houses, etc.
See Pages 872-875 Sweet's Architectural Catalogue 1916. Bulletin 205 on request

FORD TRIBLOC

A Chain Hoist that excels in every feature. It has Steel Parts, Planetary Gears, 3½ to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

FORD CHAIN BLOCK & MFG. CO., 145 Oxford St., Philadelphia

A "NATIONAL" HIGHWAY

Look For

NATIONAL

The Name

¶ The milestones passed by a traveller indicate to him the progress he has made toward his ultimate goal.
¶ The MILESTONES IN THE PROGRESS OF "NATIONAL" PIPE (a double page announcement to appear in the issue of January 5th) indicate the journey of fifty years' successful pipe manufacture. ¶ Don't forget to look for it!

NATIONAL TUBE COMPANY, Pittsburgh, Pa.

TIE PLATES *Send for Catalogue*

MANUFACTURED FROM NEW STEEL BILLETS
WORKMANSHIP AND MATERIAL GUARANTEED

THE RAILROAD SUPPLY COMPANY
BEDFORD BUILDING, CHICAGO

Cast Steel

Buckeye Truck Frames, Truck Bolsters, Key Connected Yokes and Journal Boxes. "Major" Top Lift and Side Lift Couplers.

The Buckeye Steel Castings Company

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Thor Close-Corner Drill

Most Convenient Air Tool Made for Use in Close Quarters!

SHIPPED ON TRIAL

No. 8....1¼"
No. 9....3"

ASK FOR BULLETIN

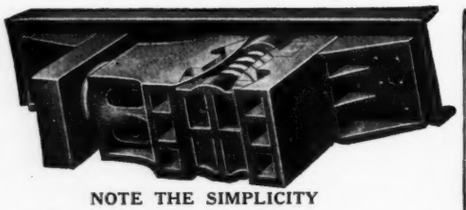
Independent Pneumatic Tool Co.

Chicago New York Pittsburgh Detroit San Francisco Montreal Birmingham

USE THE

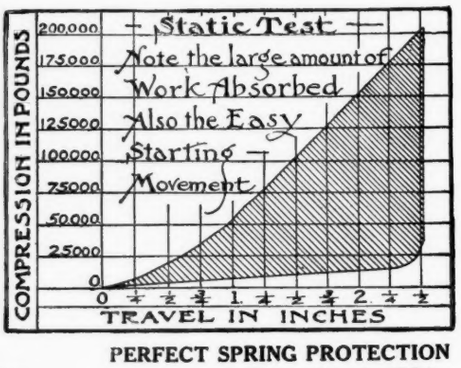
BUTLER DRAFT GEARS

FRICTION or SPRING



NOTE THE SIMPLICITY

FRICTION GEARS—Piper Patents—200,000 lbs. Capacity.
FEW PARTS.—Large Wearing Surfaces, 6½ or 9⅛ Yoke, or Combined with any Side Link Attachment.
HAS ALL THE POINTS OF A PERFECT GEAR.



ALSO TANDEM SPRING GEARS, CASE PAT., 6¼ x 8 OR 8 x 8 SPRINGS.

PERFECT SPRING PROTECTION

THE BUTLER DRAWBAR ATTACHMENT COMPANY Cleveland, Ohio

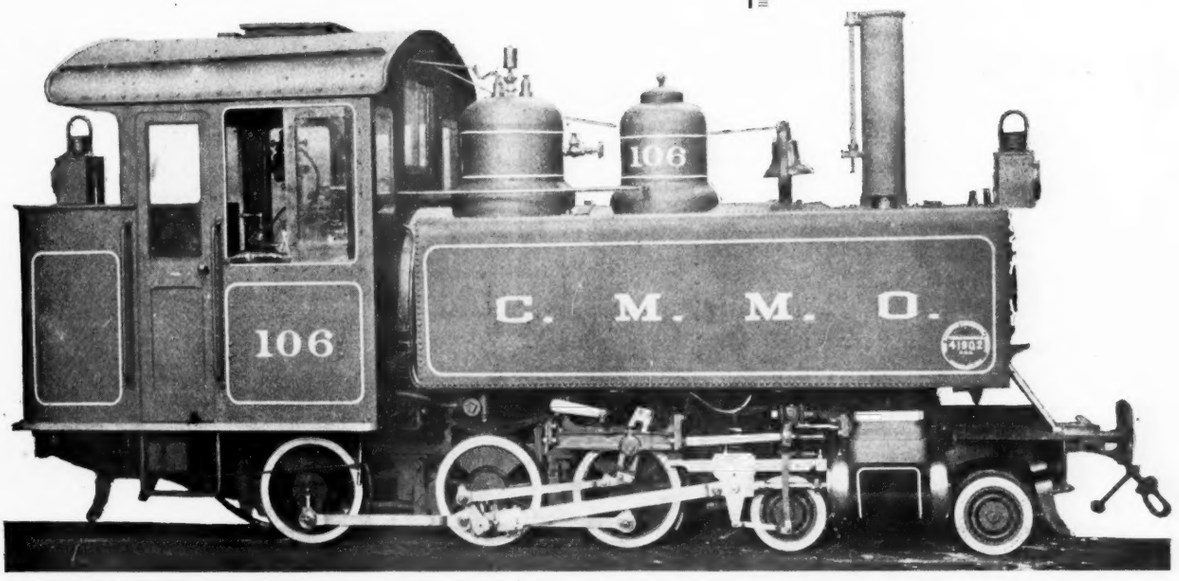
SEE THE NEW DESIGN OF THE

Cleveland Pressed Steel Carline

Specially adapted to Steel Side Plates, but equally good for Wood Framing.
The Strongest Carline made. It meets every demand of a Perfect Roof Support.

CLEVELAND CAR SPECIALTY CO., Cleveland, Ohio

"Standard" Parts
for Morocco



Throughout the railway world, in the Orient and occident, there is an insistent demand for reliability and dependability in railway equipment.

The above illustrated locomotive of the French Government (Morocco) is equipped with "Standard" No. 17 steel tired engine truck wheels; "Standard" steel driving tires; open hearth, hammered steel driving axles; engine truck axles; and steel and malleable iron castings.

ŞS BRAND *"The 'Standard' Brand on your material is an assurance of eventual economy."* ŞS BRAND

Standard Steel Works Company

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Steel Tires, Steel Tired Wheels, Solid Forged and Rolled Steel Wheels, Rolled Steel Gear Blanks, Steel Axles, Steel Springs, Steel and Iron Forgings, Steel and Malleable Iron Castings, Rolled Steel Rings, Steel Crusher-Rolls and Shells, Steel Pipe Flanges.

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WORKS:
AXLE FORGE, DEPEW, N.Y.
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CAST STEEL, DEPEW, N.Y.
DEPEW, N.Y.

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Gould M. C. B. Couplers.
Gould Vestibules, wide and narrow.
Gould Continuous Platforms and Buffers with wood sills.
Gould Continuous Platforms and Buffers with steel underframing.
Gould Steel Platforms with Friction Buffers.
Gould Friction Draft Gear for passenger equipment.
Gould Trap-Door Rigging.
Gould Journal Boxes.
Gould Malleable Iron Draft Beams.
Gould Twin Type of Draft Gears.
Gould Tandem Type of Draft Gears.
Malleable Iron Castings, scientifically annealed.
Car and Engine Axles, wrought iron or open hearth steel.
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Manufacturers of Steam Turbines Ranging in Capacity from 1 to 50,000 Kw.

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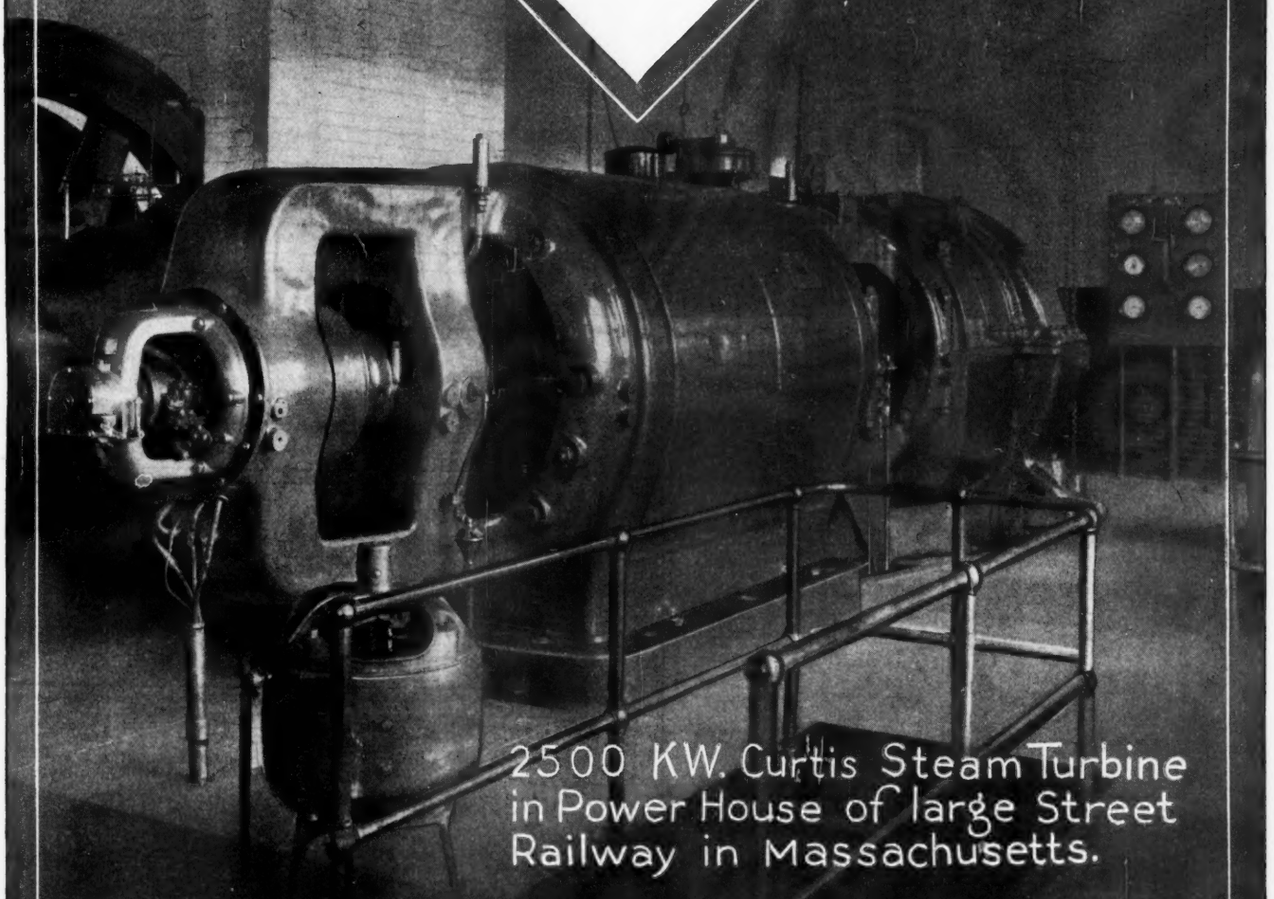

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6150

Railway Age Gazette

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WE GUARANTEE, that of this issue 9000 copies were printed; that of these 9000 copies, 7375 were mailed to regular paid subscribers, 160 were provided for counter and news companies' sales, 1028 were mailed to advertisers, exchanges and correspondents, and 437 were provided for new subscriptions, samples, copies lost in the mail and office use; that the total copies printed this year to date were 470,400, an average of 9046 copies a week.

THE RAILWAY AGE GAZETTE is a member of the Audit Bureau of Circulations.

1917

Best Wishes

for

A Happy and Prosperous

NEW YEAR

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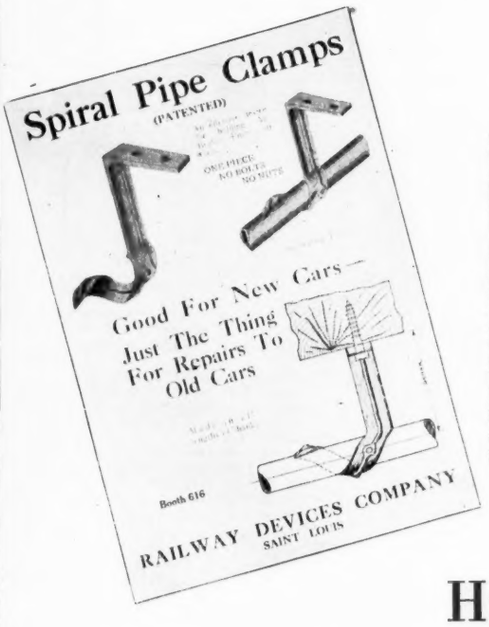

H. A. Claussen

H. A. Claussen, chief clerk to the Mechanical Engineer of the Atchison, Topeka & Santa Fe at Topeka, Kan., was born on August 21, 1881, at Stonington, Ill., and was educated at both the grammar school and Worcester Academy, Vinita, Okla., afterwards taking a business course in the Parsons Business College, Parsons, Kan. He entered railway service in 1903 as car record clerk in the office of the Car Service Agent of the Chicago & Northwestern at Chicago. Two years later he took a position as stenographer in the office of the Mechanical Engineer of the Atchison, Topeka & Santa Fe and in January, 1909, was promoted to the position he now occupies.

His Comment

TO my notion, the advertisement of the Railway Devices Company, St. Louis, appearing on page 27 of the June 16 Daily issue of the Railway Age Gazette, covering spiral pipe clamps, is of the greatest value to readers for the following reasons:

1—The advertisement is complete.

2—It gives distinct facts.

3—It explains fully the product this firm has to sell.

4—It tells for what purpose the article is used.

5—It tells where the article is used.

6—The accompanying cuts enable the reader to gather a thorough understanding of the pipe clamp advertised.

7—An order for material could be placed from this advertisement without the necessity of preliminary correspondence.

Too many of the advertisements are either incomplete or are not descriptive. Some mention the product only in a general way; others fail to state for what, or on what, the article is used, while others use space merely to present their name. While the advertiser accomplishes his purpose of keeping his name, or the name of his product, before the public, such advertisements lack instructive facts and are little used by the average reader. Usually, advertisements are used to gain additional information concerning that which is advertised, or else they are referred to with the idea of gathering details with which to place an order for material.

MISCELLANEOUS

SALE of Boise and Arrowrock Railroad. Department of the Interior, Washington, D. C., December 5, 1916. In pursuance of an Act of Congress entitled "An Act to authorize the Secretary of the Interior to cause to be appraised and to sell the Boise and Arrowrock Railroad, and for other purposes," approved August 11, 1916 (Ch. 318, 39 Stat., 506), notice is hereby given that the property described below will be sold, at not less than its appraised value, at public auction to the highest bidder, at the office of the Project Manager, U. S. Reclamation Service, City of Boise, Idaho, at 2 o'clock P. M., January 10, 1917, to-wit: **ITEM 1.** That part of the Boise and Arrowrock Railroad extending from its junction with the Oregon Short Line Railroad at Barberton, Idaho, to its junction with the Intermountain Railway near the mouth of Moore's Creek, Idaho, a distance of approximately 11.75 miles, being all the right, title and interest of the United States in and to the right of way and all structures thereon; subject, however, to two certain contracts, one with the Oregon Short Line Railroad Company, dated November 16, 1915, and one with the Barber Lumber Company, dated May 2, 1911, copies of which contracts will be furnished upon request. Appraised for $99,190.00. **ITEM 2.** The track material now upon that part of the right of way of the Boise & Arrowrock Railroad extending from the above mentioned junction point with the Intermountain Railway to the Arrowrock Dam, Idaho, a distance of approximately 5.25 miles. Appraised for $17,973.00. **ITEM 3.** The right, title and interest of the United States in and to the right of way for approximately 5.25 miles referred to under "Item 2," excluding all structures thereon. Appraised for $26,207.00. **ITEM 4.** Two locomotives, appraised at $1,000.00 each; one combined passenger and baggage car appraised at $750; one passenger coach appraised at $500.00; two flat cars appraised at $100.00 each; twenty-six gondola dump cars appraised at $250.00 each. All rolling stock standard gage. Each of the above mentioned items will be offered for sale separately. Item No. 2 and Item No. 3 will be offered together first and if not struck off will be offered separately. The rolling stock mentioned in Item No. 4 will be offered in parts. Each successful bidder will be required to deposit, at the time of accepting the bid, a certified check or New York draft payable to Special Fiscal Agent, U. S. Reclamation Service, Boise, Idaho, for 10% of the appraised value of the property struck off to him. Upon approval of bid and payment of the full purchase price the Secretary of the Interior will transfer, by appropriate conveyance, all the right, title, and interest of the United States in and to the property so sold. The entire sale is subject to the approval of the Secretary of the Interior and to his right to reject any or all bids. In case of the rejection of any bid the proceeds of the check or draft deposited by the bidder will be returned to him at once. ALEXANDER T. VOGELSANG, Acting Secretary of the Interior.

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WANTED—Situation in Claim or Traffic Department of Manufacturing or Railway Company. Thoroughly familiar with railway accounting, claim, and rate methods. Thirteen years' experience in Freight Office of large Eastern Road in city of 90,000. Now serving as Chief Claim Clerk. Age 31. Best reference from present employer. Address Box 521, Railway Age Gazette, Woolworth Building, New York, N. Y.

WANTED—Railway Supply Company with manufacturing as well as selling facilities, having office in Chicago, will consider taking active supply account. Can satisfy the most exacting as to ability and finances. Address Box 522, Railway Age Gazette, 608 S. Dearborn St., Chicago, Ill.

TRAIN MASTER with 6 years' experience, also several years as Chief Dispatcher and Dispatcher, wishes position. At present holding position as Train Master, but desires to make a change. Address Box 520, Railway Age Gazette, Woolworth Building, New York, N. Y

AN ENGINEER, in responsible charge of public utility valuation and regulation work of the most important character, wishes to find positions for a number of high-class assistants experienced in the valuation, accounting and management of railroads, gas, electric light, water and steam heating plants. The salaries of the assistants referred to for a number of years have been from $2,500 to $4,200 a year, but the work upon which they are engaged is nearing completion. Address Box 525, Railway Age Gazette, 608 S. Dearborn St., Chicago, Ill.

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POSITIONS OPEN

WANTED—Railway specialty company in Chicago wants draftsman acquainted with freight car construction to take charge of small drafting room. Technical graduate preferred. State educational qualifications, business experience and salary expected. Address Box 528, Railway Age Gazette, Transportation Bldg., Chicago.

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ANNUAL MEETING

THE ANNUAL MEETING of the stockholders of the Simmons-Boardman Publishing Co., for the election of five directors and for the transaction of any proper business, will be held in the Woolworth Building, New York, N. Y., on January 18, 1917, at 3 o'clock p. m.

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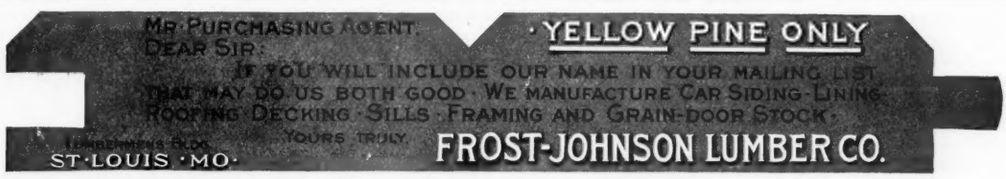
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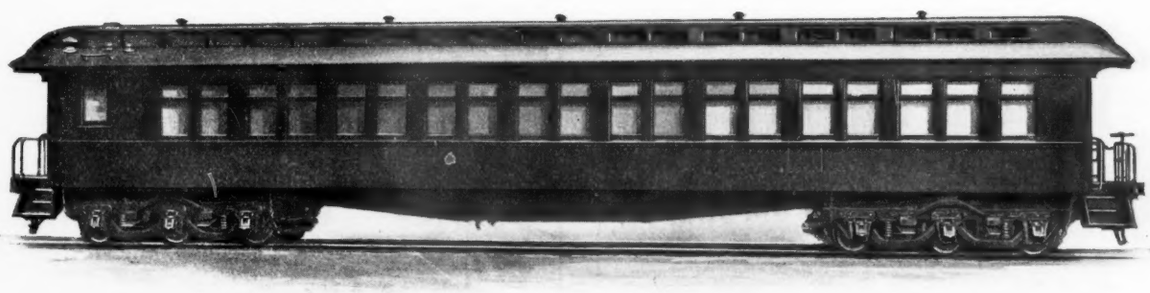

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Locomotive Superheater
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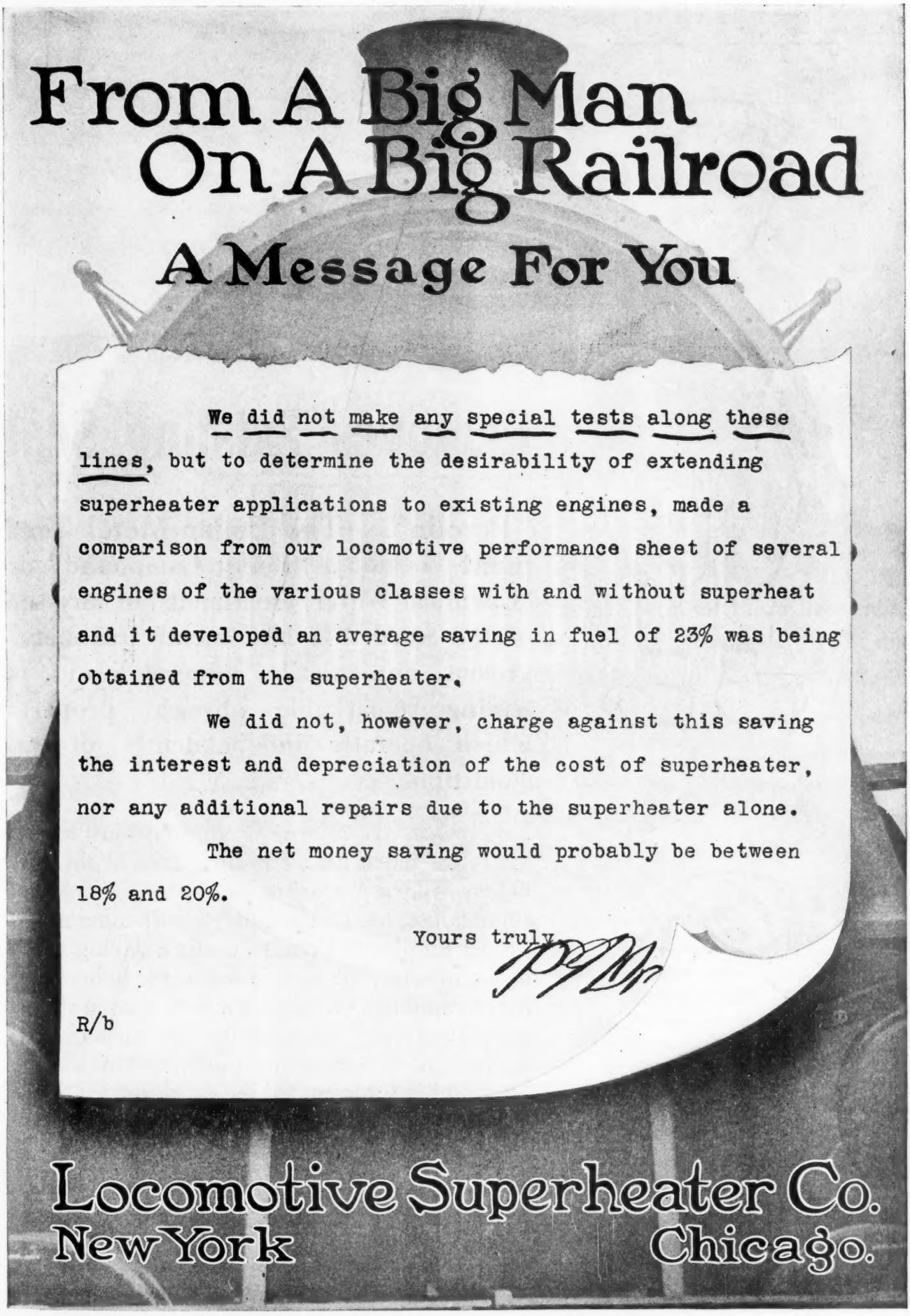
From A Big Man
On A Big Railroad
A Message For You
We did not make any special tests along these lines, but to determine the desirability of extending superheater applications to existing engines, made a comparison from our locomotive performance sheet of several engines of the various classes with and without superheat and it developed an average saving in fuel of 23% was being obtained from the superheater.
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Yours truly,
R/b
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Perolin Railway Service Co.

The Boiler Metal Treatment

Prevents Scale Formation

"Perolin" diffuses through the water and is immediately attracted to the hot boiler metal, and as a result of this attraction or affinity is drawn through the pores, cracks and crevices in the scale, into direct contact with the metal, where it works its way along the steel, breaking the bond of adhesion between the scale and the metal, leaving the metal entirely free and clean. It furthermore establishes on the bare metal a liquid preservative heat conducting film which causes the incrusting salts to remain in suspension in the water until they are removed through the blow-off cock, or during washouts.

The "Perolin" skin, or film, on the metal is a better heat conductor than water and thoroughly protects it against pitting and corrosion.

By removing all scale and keeping the boilers clean, "Perolin" eliminates boiler failures, insures reduced operating costs, minimizes repairs, reduces coal consumption and shows a big profit on the investment.

Will you give us an opportunity to prove that "Perolin" can rid your road of the scale and foaming nuisance? We maintain a corps of Mechanical Experts to instruct your men relative to the use of "Perolin" and to supervise its use continually.

RAILWAY EXCHANGE BUILDING, ST. LOUIS, MO.
PEOPLES GAS BUILDING, CHICAGO, ILL.

this advertisement shocks you

because it contains no capital letters. it is opposed to the laws of english grammar as man has decreed it shall be written. but why stick to conventionalities when by abandoning them one can drive home a point that will make a lasting impression? what if it does jar a bit?

now the point is, there are a lot of manufacturers of things which railroads buy who do not advertise. take wire fencing—a common commodity. did you ever stop to think that the railways of the united states and canada alone buy a total of 343,200,000 feet a year?

and there are many other common-place articles that are bought by railroads in huge quantities—bolts, nuts, screws, nails, spikes, bar iron, sheet steel, lumber.

the sales of each and every one of these things can be influenced by advertising if you talk to the railway officer in his own language. we publish five railway papers, each in a different dialect. let's tell you about them and submit a practical demonstration of how to interest the "billion dollar customer" in your product. you can't get at him right through any medium whose circulation is not concentrated on railway subjects.

simmons-boardman publishing co.

new york: woolworth bldg. chicago: transportation bldg. cleveland: citizens bldg. washington: home life bldg.

During the Year 1916

the

LOCOMOTIVE STOKER CO.

Received Orders for

748 STOKERS

Making a Total of

1588

in use and on order

LOCOMOTIVE STOKER CO.

Main Office and Works
Pittsburgh, Penna.

New York
50 Church Street

Chicago
Railway Exchange

The Allies
In the War on Weight
Vanadium Steel and Higher Unit Stresses

Thousands of pounds can be saved in the weight of the modern locomotive through lightening the running gear parts by taking advantage of the greater strength of vanadium steel to use higher unit stresses without sacrifice of safety.

This is shown by a careful study of the subject in consultation with the locomotive builders.

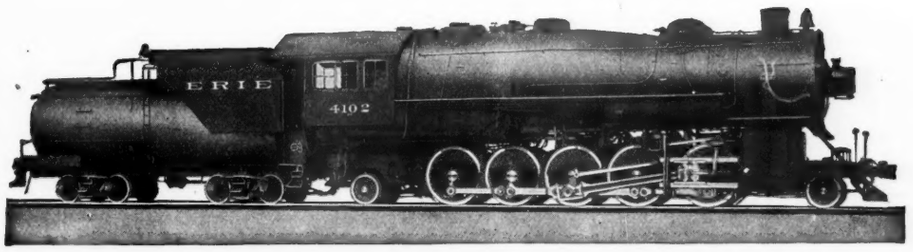
The study included a detail investigation of the design of the running gear parts of several representative heavy locomotives.

Let us show you the possibility of reducing weight as developed by our investigation.

AMERICAN VANADIUM COMPANY

NEW YORK PITTSBURGH LONDON

A NEW 2-10-2 TYPE



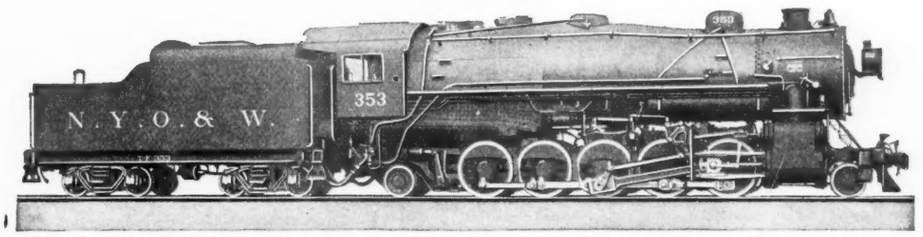
ERIE RAILROAD

Total Weight of Engine, 401,000 pounds; Weight on Drivers, 335,500 pounds; Diameter of Drivers, 63 inches; Tube Length, 17 feet; Boiler Pressure, 200 pounds; Cylinders, 31 x 32 inches; Maximum Tractive Power, 83,000 pounds

2-10-2 type locomotives, with their large tractive power, combined with sufficient boiler capacity and an ample factor of adhesion, are attracting the attention of railroad officials.

Many railroad officials when considering more powerful locomotives, have had to eliminate this type because of its long rigid wheel base.

Lateral motion driving axle and boxes were applied to the locomotives illustrated to reduce the rigid wheel base to that which is in common use on locomotives of smaller capacity, and at the same time secure the advantages of the ten-coupled wheel arrangement with the resulting increased capacity of the locomotive.

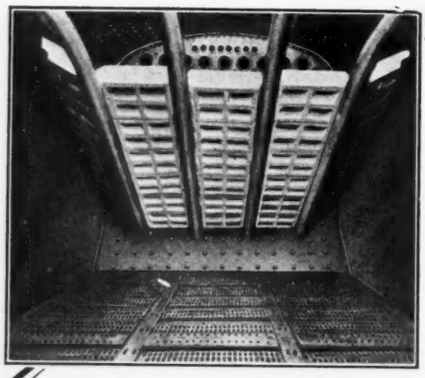


NEW YORK, ONTARIO & WESTERN RAILWAY

Total Weight of Engine, 352,500 pounds; Weight on Drivers, 293,000 pounds; Diameter of Drivers, 57 inches; Tube Length, 17 feet; Boiler Pressure, 190 pounds; Cylinders, 28 x 32 inches; Maximum Tractive Power, 71,200 pounds

AMERICAN LOCOMOTIVE COMPANY

30 CHURCH STREET, NEW YORK



WE HAVE THE WORLD'S HEAVIEST TRAINS

The principal economies in operation in this country which have made possible practically the lowest freight rates in the world have been effected in the conduct of the freight service and mainly by increasing the size of the units in which freight is transported. The railways of the United States handle more freight per car, per train and per mile than the railways of any other country in the world. The average carrying capacity per freight car in the United States in 1913 was 38 tons, as compared with 14.3 tons in Austria, 14.1 in France, 15.9 in Germany and 13.4 in Hungary. The only countries in which the average capacity of the freight cars approaches that of the United States are Mexico with 35.4 tons and Canada with 32.1. No other country in the world approaches the United States in the number of tons of freight per train. The average in 1913 was 445.4. In Canada, which comes next in order, the average was 342 tons, while in Austria the average was 195.9, in France it was 147, in Germany 239 and in Hungary 147 tons.—Railway Age Gazette, Nov. 17, 1916.

Hauling these big units economically is now our task.

Saving fourteen per cent in fuel is our part of the job—with Security Sectional Arch.

AMERICAN ARCH COMPANY

Specialists in Locomotive Combustion

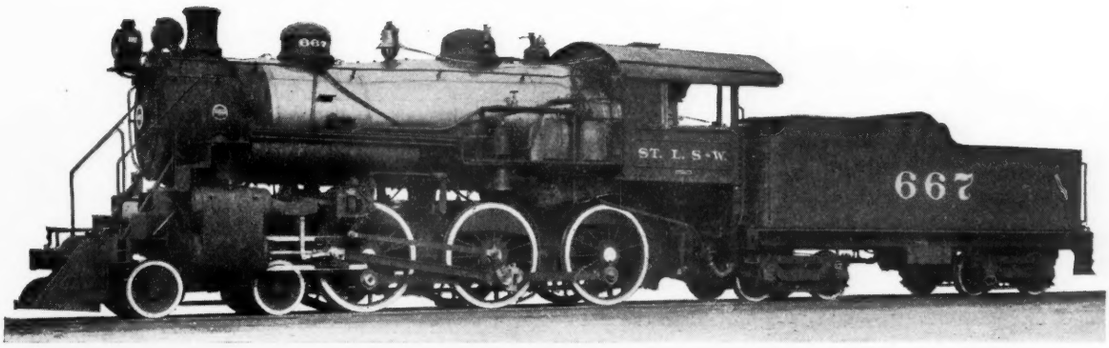
McCORMICK BLDG.
CHICAGO

30 CHURCH ST.
N. Y.

New Power for the

ST. LOUIS SOUTHWESTERN

The Ten-wheeled (4-6-0) type of locomotive has not outlived its usefulness. With a comparatively high percentage of total weight on driving-wheels, it is an economical type for work that is within its capacity.



Ten-wheeled Locomotive, St. Louis Southwestern Ry.
W. J. Miller, Supt. Motive Power.

CYLINDERS—22 x 28 inches.
DRIVING-WHEELS, DIAM.—69 inches.
STEAM PRESSURE—200 lbs.
GRATE AREA—49.6 sq. ft.
WATER HEATING SURFACE—2,474 sq. ft.
SUPERHEATING SURFACE—532 sq. ft.
WEIGHT ON DRIVING-WHEELS—165,200 lbs.
WEIGHT, TOTAL ENGINE—209,400 lbs.
TRACTIVE FORCE—33,400 lbs.

Through passenger traffic on the St. Louis Southwestern is handled by Ten-wheelers, as illustrated above. These engines are equipped with wide fireboxes, superheaters and brick arches, and represent advanced construction for their type

THE BALDWIN LOCOMOTIVE WORKS

PHILADELPHIA, PA., U. S. A.

Represented by

F. W. Weston, 120 Broadway, New York, N. Y.
Charles Riddell, 627 Railway Exchange, Chicago, Ill.
C. H. Peterson, 1210 Boatmen's Bank Bldg., St. Louis, Mo.
George F. Jones, 407 Travelers Building, Richmond, Va.
A. Wm. Hinger, 722 Spalding Building, Portland, Ore.
Williams, Dimond & Co., 310 Sansome St., San Francisco, Cal.

Cable Address: "BALDWIN, PHILADELPHIA."

Rome Superior Bent Cold

IT TAKES GOOD IRON TO STAND THE THREADED BEND TEST

It must bend cold in an arc equal to its own diameter without fracture at the root of the threads.

Rome Superior does this and more.

It makes records in the firebox.

It is built like a rope except for twisting and is twice made.

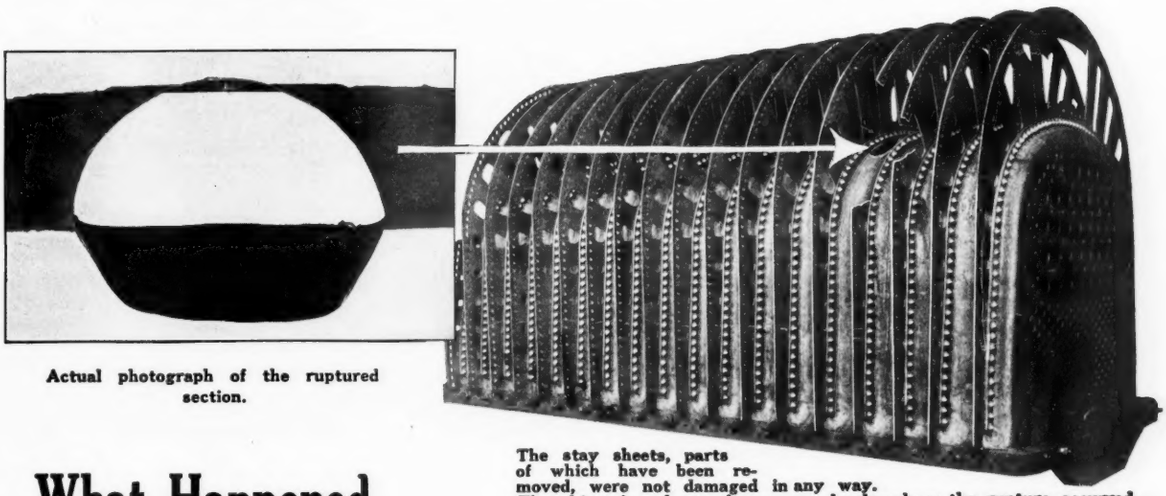
That's why it makes such records.

Rome Merchant Iron Mill

Office, 30 Church St., New York

Established 1868 Works, Rome, N. Y.

Proof of Safety
of the
JACOBS-SHUPERT FIREBOX



Actual photograph of the ruptured section.

The stay sheets, parts of which have been removed, were not damaged in any way. The object is only to show more clearly where the rupture occurred.

What Happened

when recently a locomotive equipped with a JACOBS-SHUPERT FIREBOX was subjected to abnormal low-water conditions.

Our Claims Substantiated

The above illustrations show very clearly the result of the overheating of a JACOBS-SHUPERT FIREBOX due to low water. Only one section was ruptured and the damage which was relatively small was confined to the section shown.

It might be well at this time to quote from the report of Dr. W. F. M. Goss, Dean of the College of Engineering, University of Illinois, after making the Coatesville tests on a JACOBS-SHUPERT FIREBOX. The report was dated July 31, 1912.

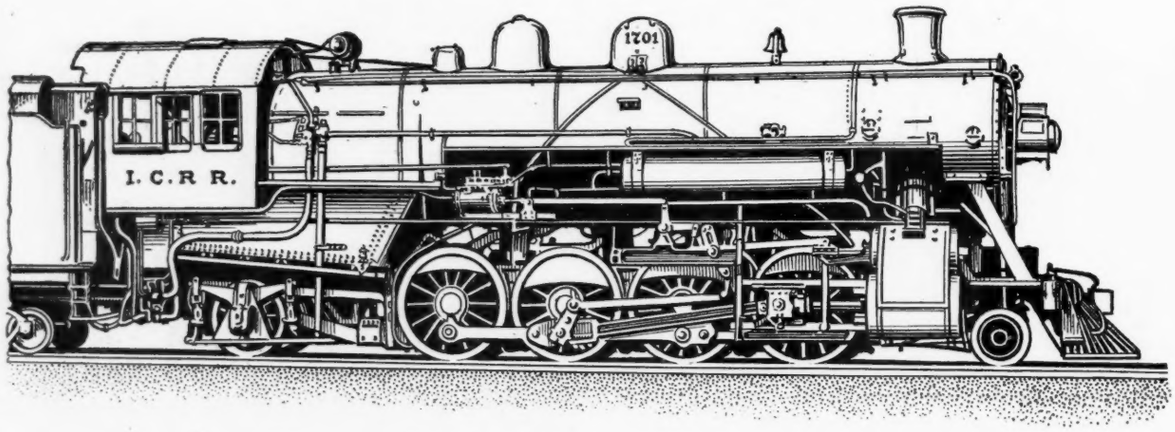
> "*That the superior strength of the* JACOBS-SHUPERT FIREBOX *under low-water conditions permits it to endure overheating without failure for long periods of time, where the normal radial-stay firebox quickly fails; and that where the overheating is so severe that it cannot be resisted, the result will be a blowout and not a disastrous explosion.*"

Over 325 JACOBS-SHUPERT FIREBOXES are now in service. Not only safety, but low maintenance costs and continuity of service are vital reasons for their success.

Jacobs-Shupert U. S. Firebox Company

30 Church Street, New York, N. Y.

Works: Coatesville, Pa.



ONE OF THE 48 MIKADOS

Illinois Central Increases Train Load 14%

Forty-eight Mikados replacing 72 smaller locomotives together with a campaign of fuel economy improvement in train movement, special attention to loss and damage claims made a remarkable annual report for the Illinois Central last year.

This is a striking example of the effect of the betterment of power upon the operation of the road.

Lima built these Mikados.

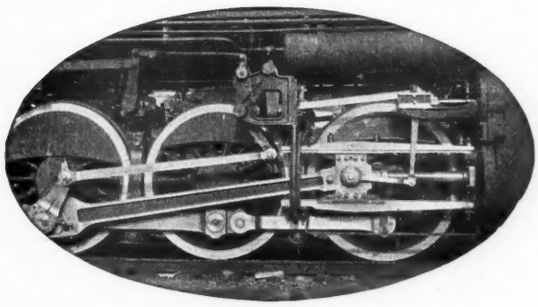
Lima Locomotive Works, Incorporated

Successors to Lima Locomotive Corporation

Lima, Ohio

30 Church Street New York

Modern Power Demands A Modern Valve Gear



Baker Valve Gear

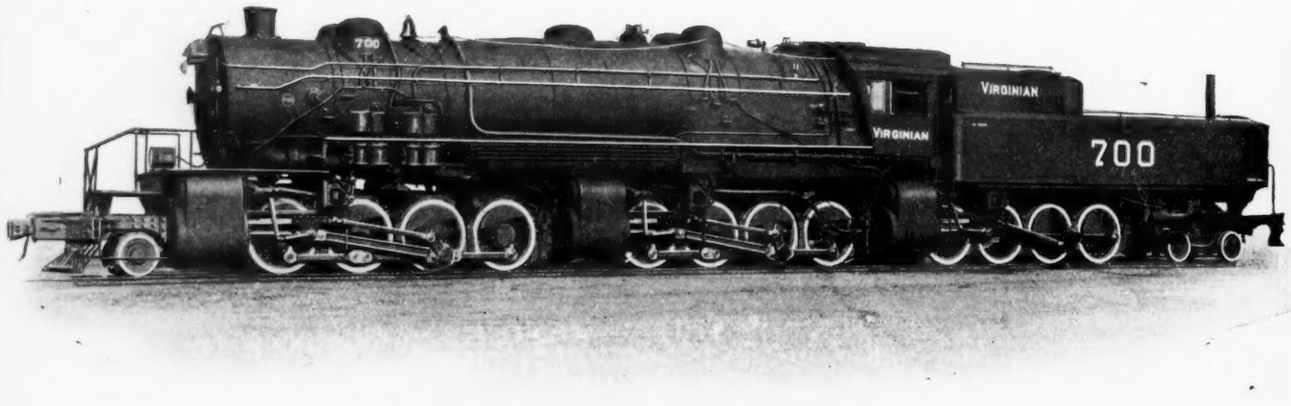
The Baker Valve Gear is the modern valve gear. On account of the absence of the link, it eliminates the multitude of troubles due to its use—Service records prove this to be a fact, and we absolutely guarantee it.

Write for a copy of the guarantee.

THE PILLIOD COMPANY

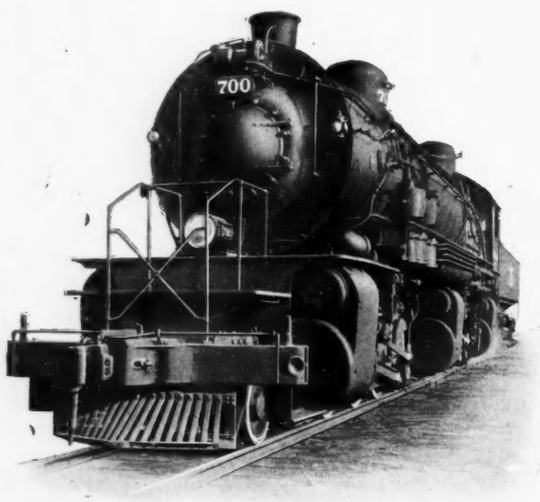
30 Church Street, New York, N. Y.

Western Representative, Mudge & Co., Railway Exchange, Chicago, Ill.



VIRGINIAN TRIPLEX—166,000 LB. TRACTIVE EFFORT

R. E. Jackson, Superintendent Motive Power — Baldwin Locomotive Works, Builder



VIRGINIAN TRIPLEX
Has the greatest tractive effort of any engine in the world

MAN POWER

Imagine this mammoth being handled by a lever reverse.

No man living could do it. No three men could.

It's three heavy Mikados in one.

Ragonnet Power Reverse reverses the engine or controls the cut-off simply by the weight of the engineer's hand on the small lever.

Ragonnet made this engine possible.

It's correspondingly good on smaller engines.

ECONOMY DEVICES CORPORATION

McCormick Bldg.
Chicago

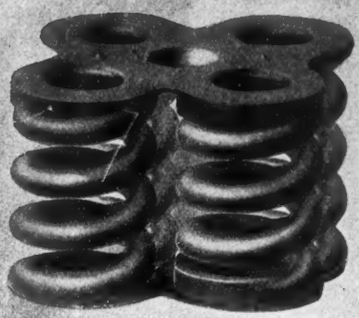
30 Church Street
New York

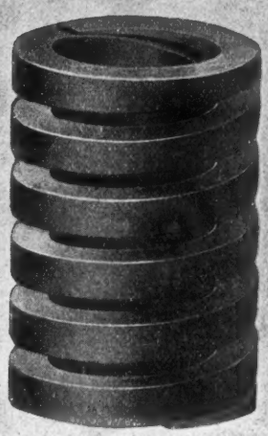
OUR DEVICES

Ragonnet Power Reverse Gear.
Casey Cavin Power Reverse Gear.
Rushton Screw Power Reverse Gear.
Lateral Motion Driving Box.
Extended Main Driving Box.

Radial Buffer.
Economy Engine Truck, 2 wheel.
Economy Engine Truck, 4 wheel.
Economy Trailer Truck.
Economy Tender Truck.

Universal Valve Chest.
Simplex Compound System.
Straightway Piston Valves.
Economy Exhaust Nozzle.
Multiple Pipe Clamps.



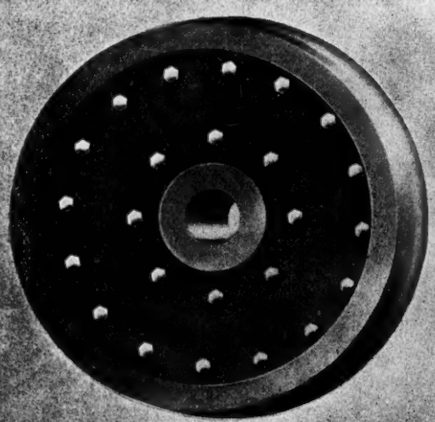
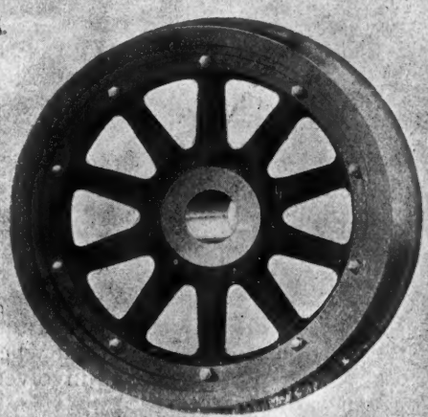
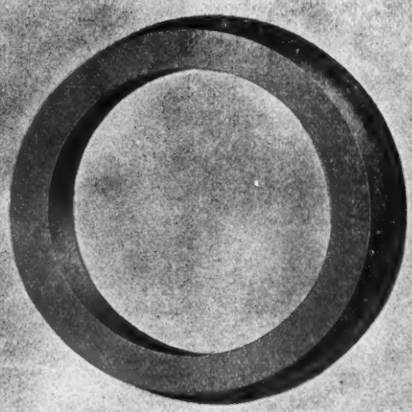


RAILWAY STEEL-SPRING COMPANY

GENERAL-OFFICES
30 Church St., New York.

BRANCHES

Chicago
Denver
Detroit
Louisville
Mexico City
St. Louis
St. Paul
Norfolk
New Orleans

There are not many Railroads in the United States but what have had some experience with the Tate Flexible Staybolt as applied to Locomotive Boilers.

A major portion of the railroads, however, have had sufficient experience with the use of the Tate Bolt, under all conditions of firebox service, to enable them to judge its true value in determining its merits from the standpoint of practical utility and economy, in firebox service.

The increased use of the Tate Flexible Staybolt among all patrons who have followed its service carefully, is sufficient indication to prove that the results obtained have fully justified its greater use and application to all fireboxes for high pressure duty.

Rigidly connected fireboxes belong to the practices of the past, and the laws of expansion that hold to the fact that suitable provisions must be made to compensate for the movement of all heat absorbing plates, is strongly adhered to in present day practice, and is followed by those who are aware of the futility of the rigid stay to obtain results that are the most desirable in this direction.

The Tate Flexible Staybolt allows the firebox to expand with more freedom and under less restriction than when rigidly stayed, thus contributing to the longer service life of all materials involved, and enhancing the value of the locomotive boiler as an earning factor.

IN USE ON OVER 500 RAILROADS

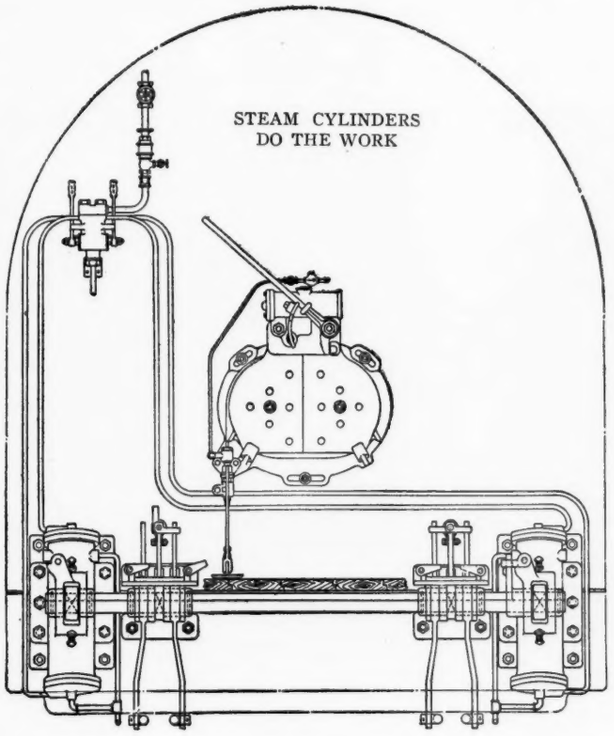
FLANNERY BOLT COMPANY

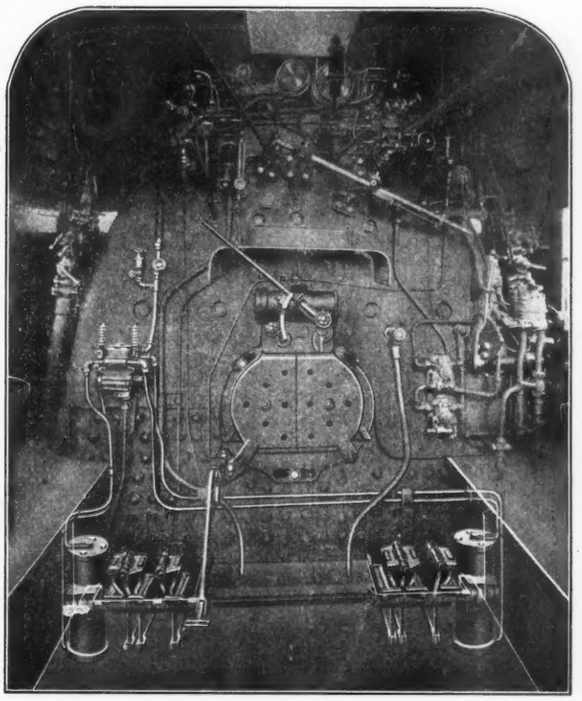
VANADIUM BUILDING, PITTSBURGH, PA. B. E. D. STAFFORD, Gen. Mgr.

J. ROGERS FLANNERY & COMPANY, Selling Agents
Vanadium Building, Pittsburgh, Pa.

GEO. E. HOWARD, Eastern Representative
W. M. WILSON, Western Representative
COMMONWEALTH SUPPLY CO, Southeastern Representatives
CHAS. HYLAND, Boiler Expert

2





FRANKLIN STEAM GRATE SHAKER.
Controlled by easily operated levers. Steam cylinders do the work.

SPEAKING OF STEAM GRATE SHAKERS

"This device probably effects the greatest saving at the ash pit when fires are being cleaned or dumped. Locomotives which were consuming 35 to 40 minutes from ash pit to roundhouse are now consuming 10 to 20 minutes. It only takes two men to handle this engine on the ash pit where it formerly took four with hand shakers, a reduction of 50% in labor."

Committee Report—Traveling Engineers Association.

Franklin Railway Supply Company

30 CHURCH STREET NEW YORK

332 So. Michigan Ave. Chicago

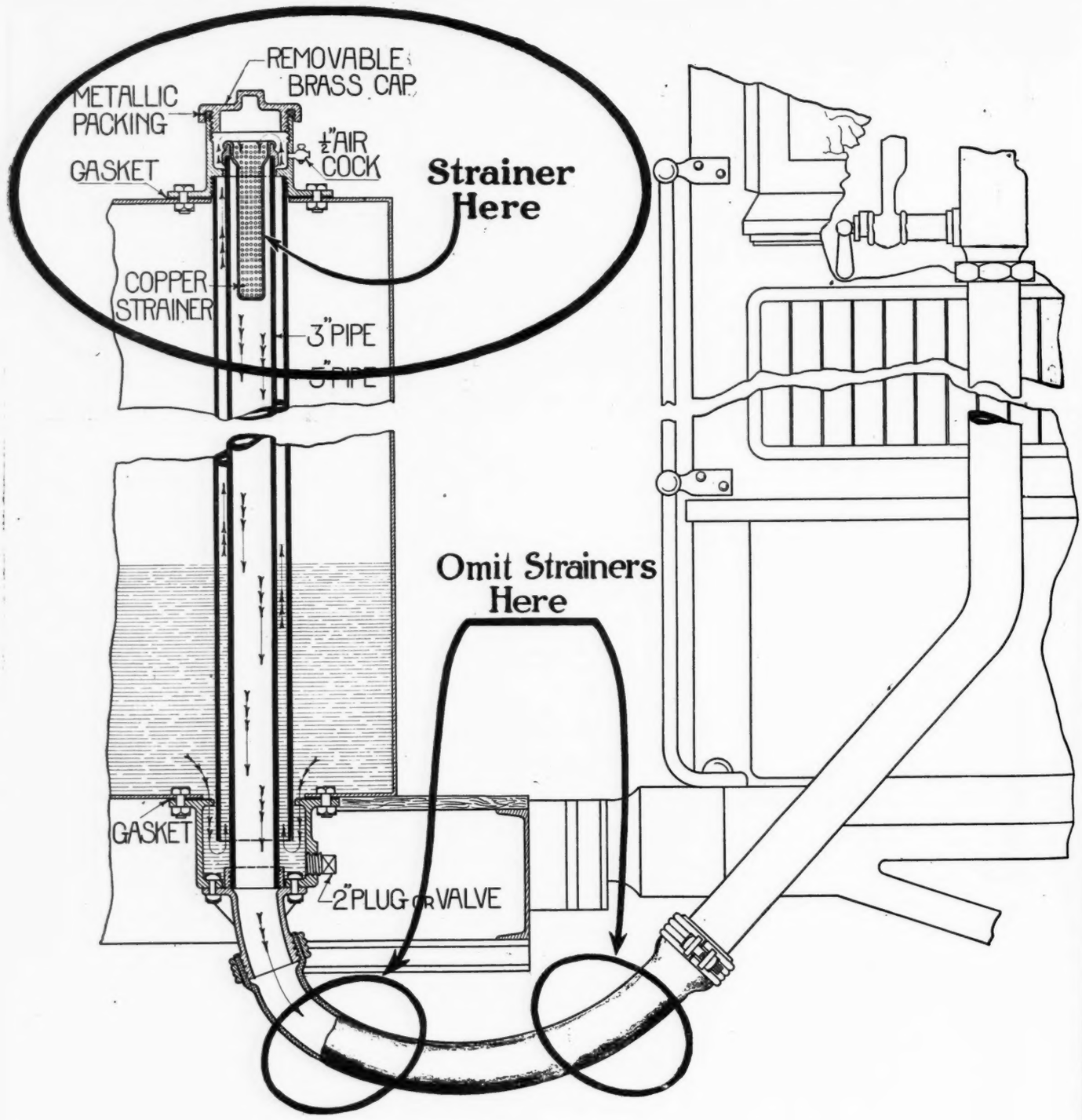
625 Transportation Bldg. Montreal

Franklin Automatic Fire Doors
Franklin Steam Grate Shakers
Franklin Automatic Driving Box Wedge
Franklin Automatic Driving Box Lubricators

Franklin Single Water Joint
McLaughlin Flexible Conduits
Franklin Grease Machine

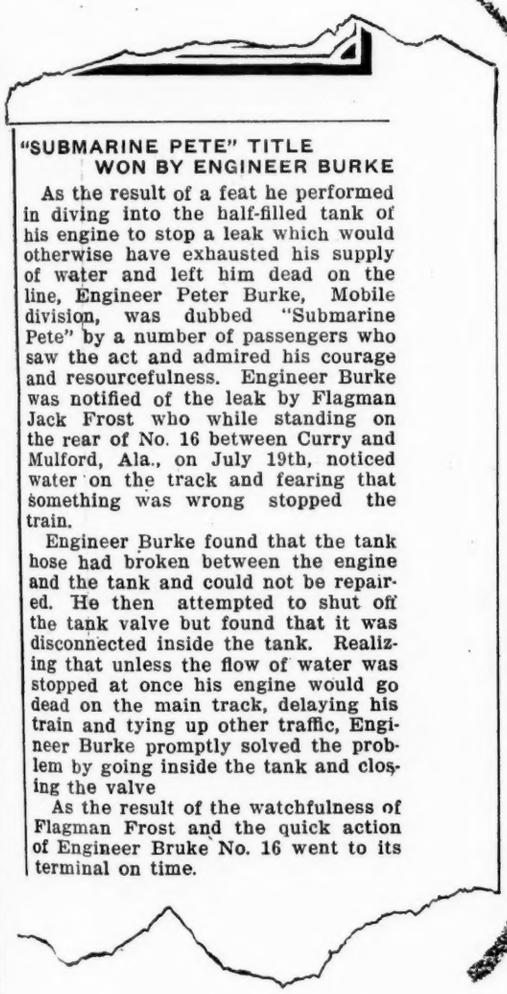
Franklin Ball Joints
Franklin Steam Chest Plug
McLaughlin Lock Nuts
Franklin Cold Water Sprinkler

One Strainer



Western Railway Equipment

For The Syphon



"SUBMARINE PETE" TITLE WON BY ENGINEER BURKE

As the result of a feat he performed in diving into the half-filled tank of his engine to stop a leak which would otherwise have exhausted his supply of water and left him dead on the line, Engineer Peter Burke, Mobile division, was dubbed "Submarine Pete" by a number of passengers who saw the act and admired his courage and resourcefulness. Engineer Burke was notified of the leak by Flagman Jack Frost who while standing on the rear of No. 16 between Curry and Mulford, Ala., on July 19th, noticed water on the track and fearing that something was wrong stopped the train.

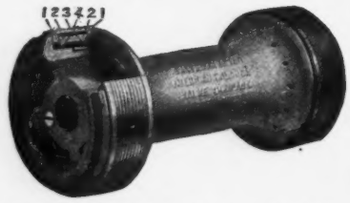
Engineer Burke found that the tank hose had broken between the engine and the tank and could not be repaired. He then attempted to shut off the tank valve but found that it was disconnected inside the tank. Realizing that unless the flow of water was stopped at once his engine would go dead on the main track, delaying his train and tying up other traffic, Engineer Burke promptly solved the problem by going inside the tank and closing the valve

As the result of the watchfulness of Flagman Frost and the quick action of Engineer Bruke No. 16 went to its terminal on time.

Cut out the high diving Use Sinstrom Syphon No Valves

Company Saint Louis

Super-Heated Steam SEMI-PLUG VALVE



THE ONLY **Steam Tight Valve**
THE ONLY **Frictionless Valve**

The ONLY Valve which is MAINTAINED by DUPLICATE PARTS from STOCK

American Balance Valve Co.
Jersey Shore, Penna.
BALANCE VALVE SPECIALISTS SINCE 1890 1

The Crosby Pressure Gage TESTER

Designed and Constructed on Scientific Principles.
It Is Mathematically Correct
Moderate in Price
Simple and Durable.
It is the Best One on the Market
Manufactured and Sold by

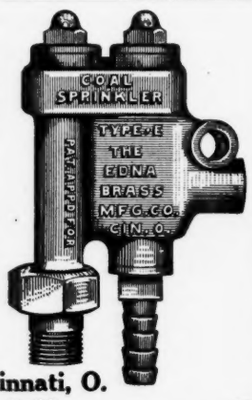
Crosby Steam Gage & Valve Co.
Boston New York Chicago London 4

FEDERAL BOILER INSPECTION
EASILY TAKEN CARE OF BY
FALLS HOLLOW STAYS

They eliminate drilling expenses and make unfailing tell-tales on fractured or broken stays. They possess double the endurance of Solid Stays, and are a proof without test against broken stays.

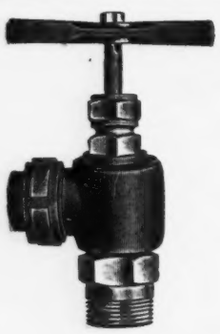
FALLS HOLLOW STAYBOLT CO., Cuyahoga Falls, Ohio, U. S. A. 1

COAL SPRINKLER!



The Edna Type "E" Lifting Coal Sprinkler fills a want for "Safety First." Handles water at a very low degree of heat.
No scalding or burning with steam or water possible.
Is automatic in action.
No other Sprinkler on the market has a wider range of action and is mechanically constructed for repairs without removal from pipes.
Will throw a stream of water 25 ft. with ⅜" hose nozzle.
Prices and details furnished on request.
We manufacture a complete line of Injectors, Lubricators, Boiler and Line Check Valves, Reflex Water Gauges and other brass locomotive appliances.

The Edna Brass Mfg. Co., Cincinnati, O.
CHICAGO OFFICE: 551 McCormick Building 10



Main Steam Valves

Our long experience in manufacturing boiler appliances of all descriptions enables us to produce the most practical and serviceable material for railroad service.

Our steam valves are made of metal found to be most suitable for resisting the wear of service. Inlet and outlet openings are of liberal size. The designs combine strength with pleasing appearance.

The stems of these valves are made of hard Tobin Bronze.

Injectors, Lubricators and Locomotive Appliances
Descriptive Catalogue on Request

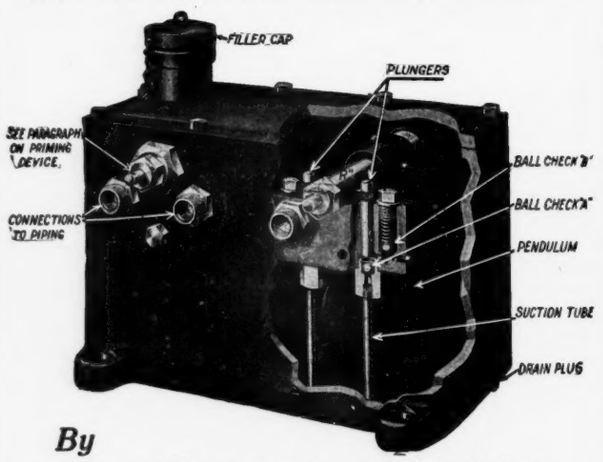
NATHAN MANUFACTURING CO.
101 PARK AVE NEW YORK

Western Office: 1612 Old Colony Building, Chicago
St. Louis Office: Frisco Building
SOLE AGENCY OF THE COALE MUFFLER SAFETY VALVES

Solves Flange Lubrication Problems

You know what efficient Flange Lubrication means in decreased flange wear and greater mileage of tires. How it increases the life of rails on curves, decrease wear on switch points and the number of derailments.

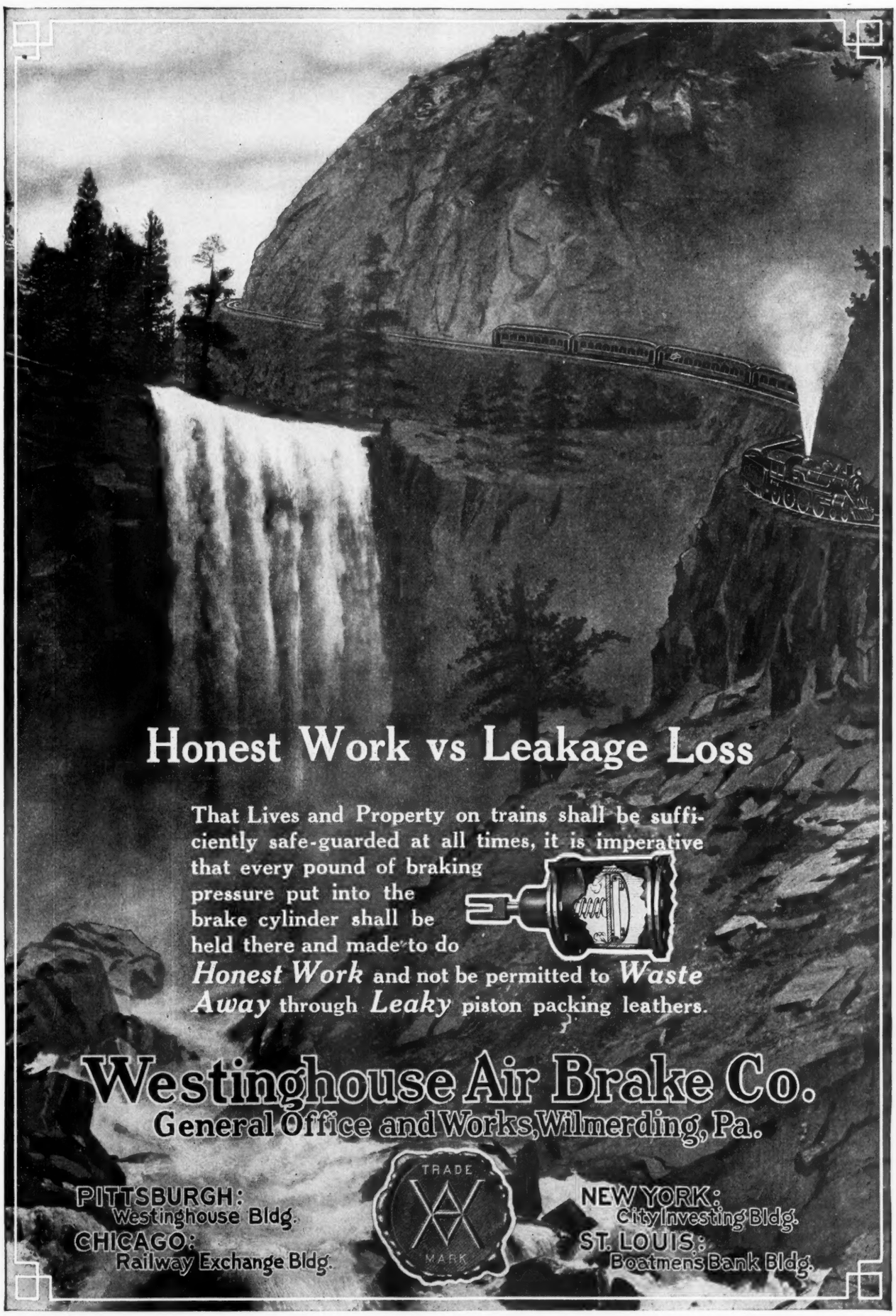
You know the duties of your engineers practically prevent them starting a manually operated flange lubricator at every curve. Then why not secure efficient flange lubrication



By Letting The Pendulum Do The Work

Detroit Automatic Lubricators (Pendulum Type) are rendering satisfactory service, and saving dollars this very moment on many leading railway systems. **How about your road?** Booklet FO-75 shows clearly why it pays to "let the pendulum do the work."

DETROIT LUBRICATOR COMPANY.
DETROIT, U.S.A.
CANADIAN DETROIT LUBRICATOR COMPANY LTD. WALKERVILLE, ONTARIO.
MAKERS OF THE STEWART CARBURETORS



Honest Work vs Leakage Loss

That Lives and Property on trains shall be sufficiently safe-guarded at all times, it is imperative that every pound of braking pressure put into the brake cylinder shall be held there and made to do *Honest Work* and not be permitted to *Waste Away* through *Leaky* piston packing leathers.

Westinghouse Air Brake Co.

General Office and Works, Wilmerding, Pa.

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A Sign Of Service

G S O C

A Mark Of Quality

CORROSION

The Corrosion of steam boilers, when due to the action of the water, will develop from several primary causes, or a combination of them:—

The presence of corrosive mineral salts in the water, such as sodium chloride, sulphate, etc.

The presence of free sulphuric acid in the water.

The use of extremely pure waters, which have a solvent action upon the metal of the boilers.

The use of Soda Ash for water softening, due to excessive accumulation of the soda salts in the boiler.

The liberation of acid beneath sulphate of lime scale.

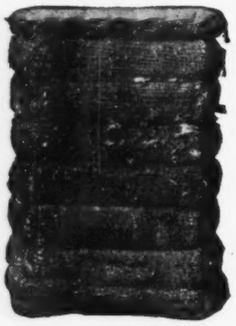
Corrosion and pitting are of a more serious nature than scale formation, as they consist of an actual disintegration and destruction of the metal of the boiler flues and sheets.

Where corrosive troubles have been experienced, DEARBORN TREATMENT has effected savings in repairs and renewals and increased life of flues far greater than the cost of the treatment.

If you are having troubles due to corrosion let us advise regarding treatment. Gallon samples of the boiler water supplies required for analysis.

DEARBORN CHEMICAL COMPANY
McCormick Building, Chicago

Dexter P. Lillie Co.



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WASTE

Manufacturers of
Wiping and Packing Waste

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"Quality—Are Durable and the Strongest Blocks made — Special Blocks of all styles for all kinds of heavy work—Large stock always on hand for quick deliveries."

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Capital, $500,000

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GOODRICH
Pneumatic Tool Hose

Chosen by big road, after 36 months test

Here's the story. Officials of a large railroad, having difficulty with pneumatic tool hose, decided to test sixteen prominent makes of hose and adopt the best hose as "standard" for that road. For thirty-six months, these sixteen makes of hose were tested in every possible service. And Goodrich came through with the best record.

Goodrich Pneumatic Tool Hose was approved for all requirements because Goodrich gave the best service of the sixteen tested makes. It combines flexibility and strength and is the best adapted tool hose for railroad requirements. That's why Goodrich was awarded the business.

Railroads everywhere have doubled their orders for 1915 for all Goodrich Railroad Rubber Goods.

Goodrich will help solve your problem. Write us about it.

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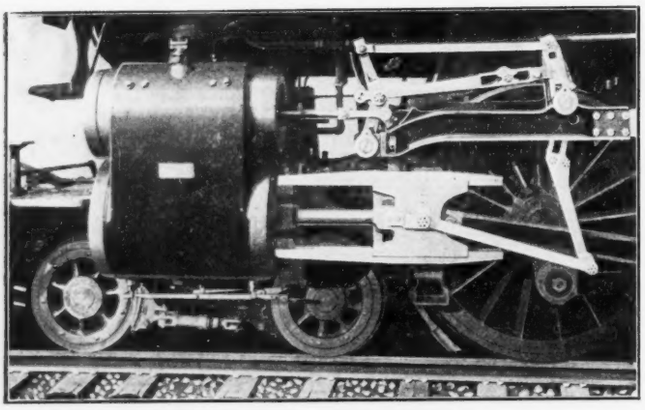
Makers of the Celebrated Goodrich Automobile Tires—
"Best in the Long Run"—and everything that's best in rubber goods

Branches and Distributors in All Districts

Factories: Akron, Ohio



Young Valve Gear

Long Valve Travel

Its Relation to Locomotive Performance

THE long valve travel obtained by the use of the Young Valve Gear makes it possible to use a greater combined lap and lead, and still have a very late maximum cut-off.

This gives the locomotive more starting power.

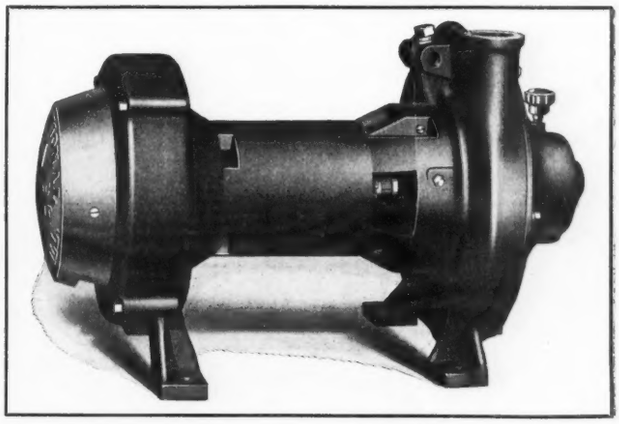
Train loads are limited by the tonnage the engine will start.

Any train that an engine can start can be readily hauled over the road.

Increased starting power means increased tons per mile.

The Pyle-National Company

Pyle-National Generators



Voltage Regulation 2%

Between No Load and Full Load

THESE Pyle-National Turbo-Generators are especially adapted to Headlights, Suburban and Branch Train Lighting and operate at full rated capacity on all steam pressures from 100 to 250 pounds per square inch—superheated or saturated steam.

The design is simple and the parts are easily accessible.

The consumption of steam and oil is reduced to a minimum, and very little attention is required.

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Fulfill every requirement of modern movable bridges, and are replacing swing bridges in this country and abroad

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CAPACITY OF BRIDGE WORKS, 75,000 TONS PER ANNUM

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BRIDGES AND OTHER STRUCTURES OF STEEL

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Piles, Paving Blocks, Conduits, Signal Posts, Signal Wire Casings, Steam Pipe Casings, Wood Pipe, and all forms of creosoted wood.

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TIMBER, LUMBER, PILING, TIES, OAK, FIR, YELLOW PINE.

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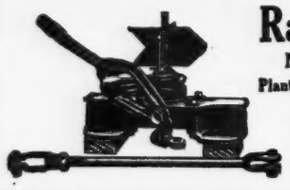

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WHY NOT AVOID REPAIRS ON TRUNKING & CAPPING by specifying CYPRESS "the Wood Eternal" NOW instead of later?

Several Great Ry. Systems are insisting on all-heart CYPRESS. BECAUSE it LASTS & LASTS & LASTS.

Nobody enjoys Repairs - Cypress lasts.

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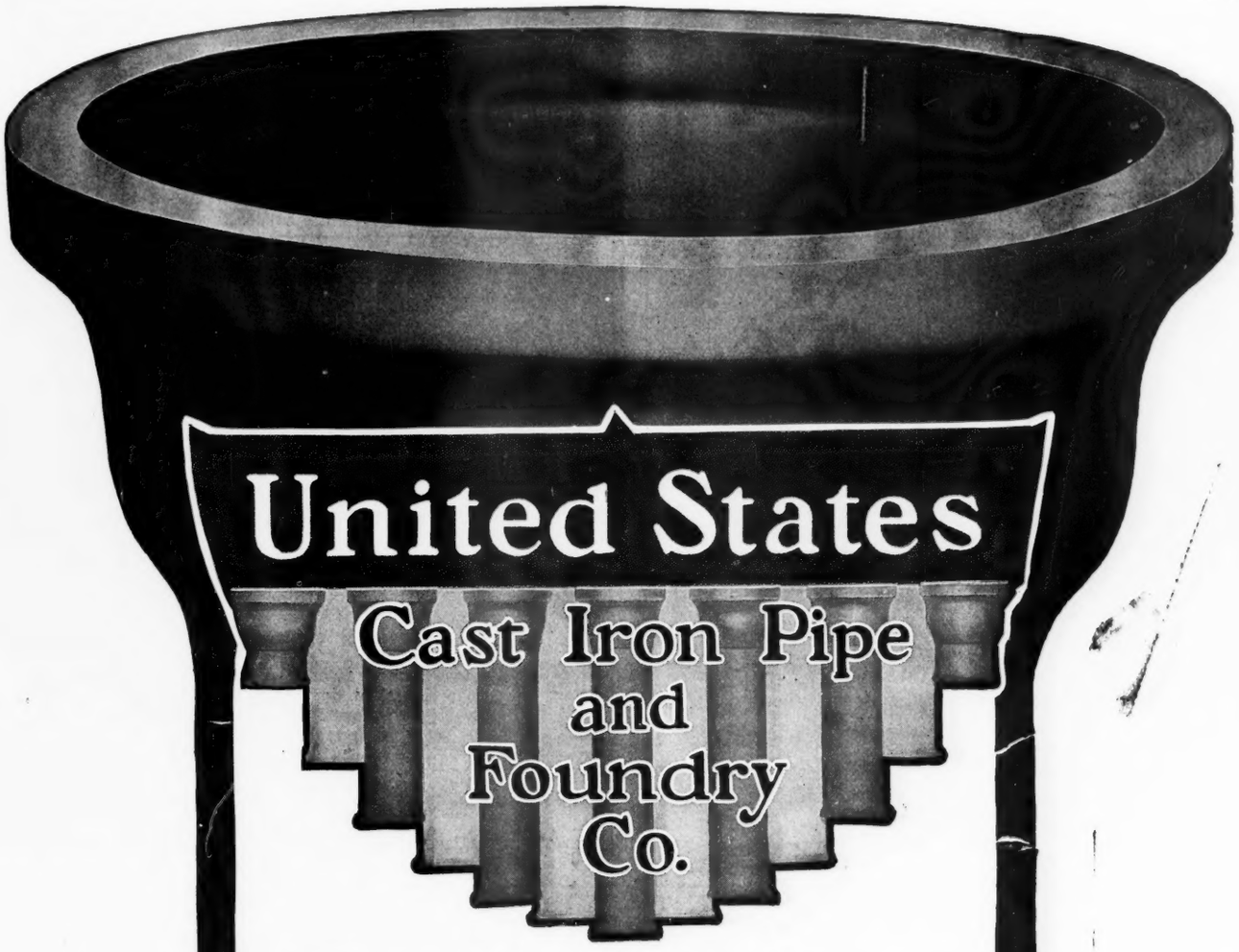

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Peace from Repairs and Renewals
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Such the Shield Afforded You by

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Highest quality rust-resisting galvanized sheets manufactured. Demand this material in your Culverts and insure greatest service. Look for the Keystone added below APOLLO trade mark. We also manufacture Apollo Formed Roofing Products, Black Sheets, Tin and Terne Plates, Etc.

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The Indestructible rail joint insulation. A perfect non-conductor under all climatic conditions. Write for full particulars.

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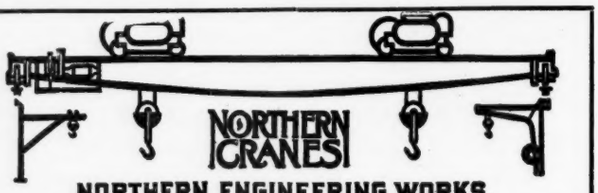

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PANAMA PACIFIC INTERNATIONAL EXPOSITION GRAND PRIZE

FOR elevators, dredges, lumbering, mining, oil-well drilling, suspension bridges, stump-pulling, cranes, derricks, ships' rigging and every other form of wire rope use.

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Class "O" Type

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Either Thoroughfare or Switch Valve Type of steam supply. Fitted with float controlled or water seal overflow as may be necessary. Single piece castings, automatic raw water control, double filtration, simple design, simple in operation.

Bulletin No. 783 is descriptive.

We carry stock on all sizes and can make immediate shipment

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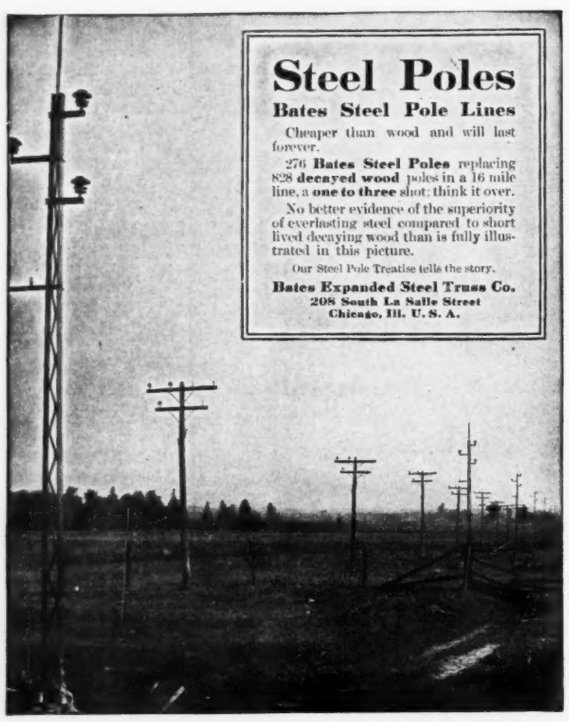

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Bates Steel Pole Lines

Cheaper than wood and will last forever.

276 **Bates Steel Poles** replacing 828 **decayed wood** poles in a 16 mile line, a **one to three** shot; think it over.

No better evidence of the superiority of everlasting steel compared to short lived decaying wood than is fully illustrated in this picture.

Our Steel Pole Treatise tells the story.

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We have constantly on hand about two thousand tons of steel and can make immediate shipment. We make the STRONGEST pole in the world of like weight. They are made of ONE PIECE of steel. There are NO RIVETS, BOLTS or JOINTS to rust and loosen. They are easily painted and will last forever.

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CROSSINGS, SWITCHES, SWITCH STANDS
FOR
MOST SEVERE USE

WE SPECIALIZE ON THIS GRADE OF WORK

CLEVELAND FROG AND CROSSING CO.
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Better Observance of Signals Is Obtained By Using Cab Signals

As developed in connection with the Simmen System, cab signals are practical, reliable, low in first cost and maintenance cost, and adaptable to a variety of traffic conditions.

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Write for our booklet "Progressive Signaling"

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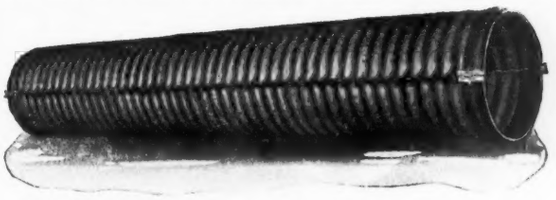
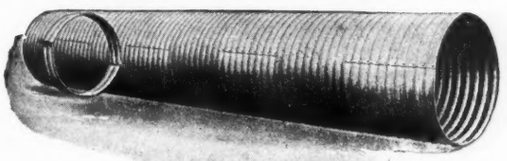
Seriously Inconveniencing some Culvert Manufacturers throughout the Country

WE HAVE THE MATERIAL AND THE CULVERTS



"ACME" (Nestable) Made of No-co-ro Metal
(Shipped Set-up or knocked DOWN)



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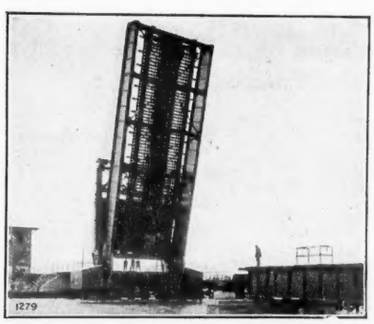
WE CAN MAKE VERY PROMPT DELIVERIES

THE CANTON CULVERT & SILO CO.
MANUFACTURERS
CANTON, OHIO, U.S.A.

AMERICAN BRIDGE COMPANY
HUDSON TERMINAL-30 CHURCH STREET, NEW YORK

Manufacturers of Steel Structures of all classes particularly BRIDGES AND BUILDINGS



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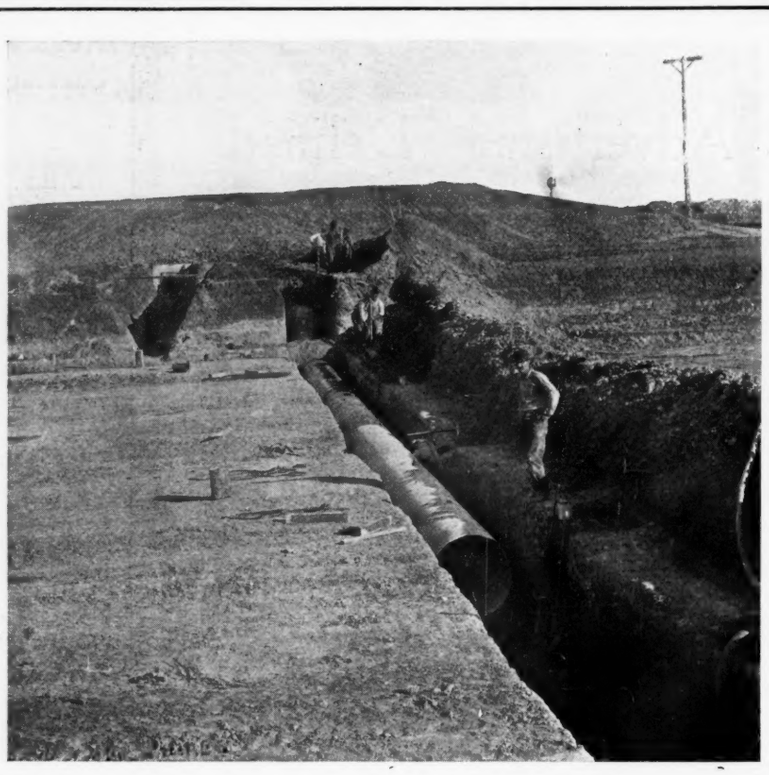
AMERICAN ARMCO INGOT IRON

"Armco" Iron Corrugated Siphons



solve many a problem for the railroad, highway or irrigation engineer. Wherever it is desirable to carry a stream under a roadway, railroad or another watercourse, this construction has many advantages.

It is easily transported and installed; if necessary, it can be made perfectly water-tight; and once in place it is good for a long lifetime of service.

ARMCO IRON
Resists Rust

because of its unequaled purity and the scientific care which controls every phase of its production.

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Whiting Straight-Line Car Wheel System

Saves fully 50% of floor space required by circular or jib crane installations. All machinery operated by power and manual abor practically eliminated.

Two men with two boys can easily distribute molten metal and pit hot wheels for an output of 200 to 250 wheels a day.

With slight modifications, this system can be installed in existing buildings.

If you contemplate a new plant or changing your present installation, let us talk the matter over with you. Our experts will be glad to assist and give you benefit of the data gathered during many years' experience.

Complete Foundry Equipments

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FOUNDRY EQUIPMENT CO.
HARVEY-ILL. U.S.A.
CHICAGO SUBURB

Cranes of all Types

Saving 30 Hours And 16 Men On This One Job

AND at 22½ cents an hour, which this railway pays these men, the Brownhoist *actually saved* this road $108.00 *in less than two hours,* on this job.

The steel underframes are unloaded direct from the cars right on to the trucks, by the Brownhoist, at the rate of one every six and one-half minutes. With 14 men as helpers, the sixteen frames were unloaded and mounted in 1¾ hours. Formerly, this job was performed by 30 men taking 2 hours, to unload and mount each of the 17,000 lb. frames.

Is it any wonder that this Brownhoist is in use every minute of the ten hour day—effecting equally big savings in time and labor? Furthermore, in the three years this Brownhoist has been in use, it has only lost eleven days of "revenue" service—that time being given to general overhauling on only two occasions.

This productive efficiency together with the typified Brownhoist feature—"Service"—are readily explained by the three cardinal characteristics that are built into every Brownhoist—namely, Speed, Durability, and Safety.

We have published a catalog that is profusely illustrated with many typical railway applications. By writing for this Catalog I may aid you in solving many perplexing problems.

The Brown Hoisting Machinery Co.
CLEVELAND, OHIO
Engineers and Manufacturers of Cranes and Hoists
Branch offices in
New York, Pittsburgh, Chicago, San Francisco, Montreal and (Portland, Ore., Colby Engr. Co.)

Western Air Dump Cars

Operate your work trains on short schedules with no interference to traffic. Western Air Dump Cars practically eliminate time, cost and labor of handling excavated materials and make short work-train schedules possible. Send for Catalog.

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AURORA, ILL.

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LOCOMOTIVE
CRANES
OHIO LOCOMOTIVE CRANE CO.
Spring Street - - - BUCYRUS, OHIO

"Be sure you're right—then go ahead." It's the same in placing your advertising. If you want to cover the railway field, your medium should be the
RAILWAY AGE GAZETTE

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LOCOMOTIVE CRANES
THE BROWNING COMPANY, CLEVELAND
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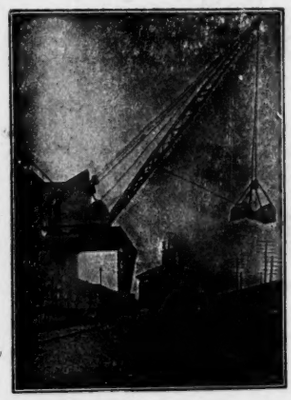

Locomotive Cranes And Buckets

Modern railroading demands speed, durability and dependability from all its equipment. O. & S. Locomotive Cranes for general railway service are ideal. Note the Electric Gantry Locomotive Coaling Crane. This crane is equipped with a 15 ft. span, 50 ft. boom, and 1½ cu. yd. bucket.

Write for catalog No. 9—replete with valuable data for the railroad man.

Orton & Steinbrenner Co.
Offices: Chicago, Ill.
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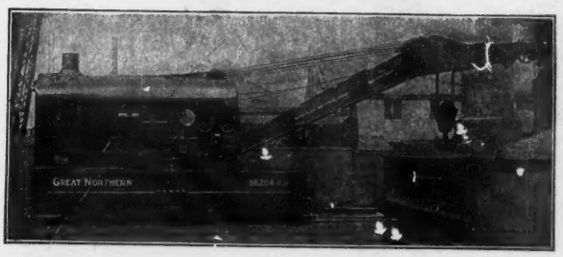
INDUSTRIAL WORKS CRANES

Steam or Electric, 5 to 160 tons capacity.
The Standard Railroad Cranes.



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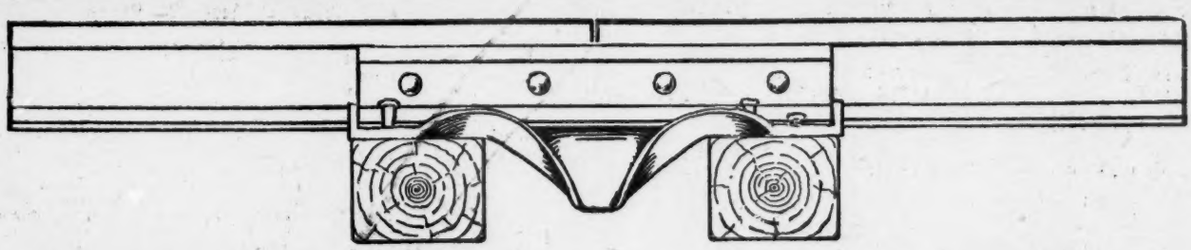
BAY CITY, MICH.
2



ABBOTT RAIL-JOINT PLATES

assure smooth-running track surface, prevent destruction of rail ends and save labor and expense on joint repairs.

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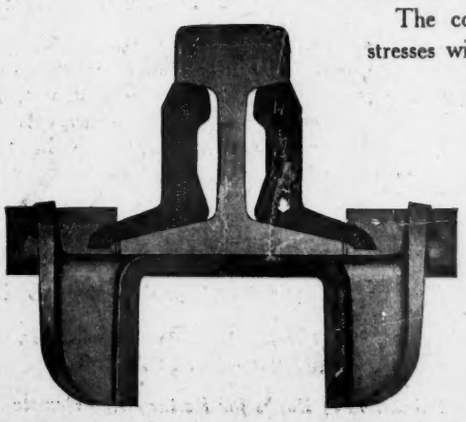

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